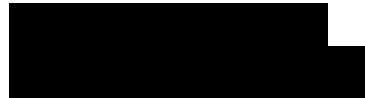


IN THE UNITED STATES DISTRICT COURT  
FOR THE DISTRICT OF DELAWARE

SAMSUNG ELECTRONICS CO., LTD., )  
)  
Plaintiff, )  
)  
v. )  
)  
IMPERIUM IP HOLDINGS (CAYMAN), )  
LTD., )  
)  
Defendant. )

**Redacted- Public Version**

C.A. No. 15-1059-CFC-CJB



**PLAINTIFF SAMSUNG ELECTRONICS CO., LTD.'S CONCISE  
STATEMENT OF FACTS FOR PARTIAL SUMMARY JUDGMENT**

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\* All emphasis added unless otherwise indicated.

**INDEX TO APPENDIX OF EXHIBITS**

<b>Exhibit No.</b>	<b>DESCRIPTION</b>	<b>APPENDIX RANGE</b>
	Declaration of Kathryn C. Thornton in Support of Samsung's Motion for Partial Summary Judgment	
<b>1.</b>	Excerpts from Complaint, <i>Imperium IP Holdings, Inc. v. Apple, Sony, et al.</i> , D.I. 1, No. 11-cv-163 (E.D. Tex. Mar. 30, 2011)	A001-A004
<b>2.</b>	Settlement and License Agreement between Imperium and Sony Mobile and Sony Corporation, May 2013	A005-A026
<b>3.</b>	Excerpts from January 29, 2021 Hearing Transcript, <i>Samsung Elecs. Co, Ltd. v. Imperium IP Holdings (Cayman), Ltd.</i> , No. 15-1059-CFC-CJB	A027-A034
<b>4.</b>	Excerpts from Imperium's Objections and Responses to Samsung's RFAs (February 1, 2021)	A035-A040
<b>5.</b>	Excerpts from Complaint, <i>Imperium IP Holdings (Cayman), Ltd. v. Samsung Elecs. Co., Ltd.</i> , No. 4:14-cv-00371 (E.D. Tex. Sept. 6, 2014)	A041-A047
<b>6.</b>	U.S. Patent No. 7,092,029	A048-A068
<b>7.</b>	Imperium Infringement Contentions, PR 3-1 and 3-2 Disclosures (Jan. 26, 2015)	A069-A073
<b>8.</b>	Excerpts from Expert Report of Cameron HG Wright ("Wright Report") (Sept. 9, 2015)	A074-A116
<b>9.</b>	Compilation of Wright Report Exhibits Concerning '029 Patent, Claim Element 1[a] for Sony-Only Digital Cameras	A117-A173
<b>10.</b>	Compilation of Wright Report Exhibits Concerning '029 Patent, Claim Element 1[a] for Sony-Only Smartphones	A174-A188
<b>11.</b>	Compilation of Wright Report Exhibits Concerning '029 Patent, Claim Element 1[c] for Sony-Only Digital Cameras	A189-A274
<b>12.</b>	Compilation of Wright Report Exhibits Concerning '029 Patent, Claim Element 1[c] for Sony-Only Smartphones	A275-A288
<b>13.</b>	Compilation of Wright Report Exhibits Concerning '029 Patent, Claim Element 14[a] and Sony-Only Digital Cameras	A289-A333

14.	Compilation of Wright Report Exhibits Concerning '029 Patent, Claim Element 14[a] for Sony-Only Smartphones	A334-A342
15.	Compilation of Wright Report Exhibits Concerning '029 Patent, Claim Element 14[b] for Sony-Only Digital Cameras	A343-A399
16.	Compilation of Wright Report Exhibits Concerning '029 Patent, Claim Element 14[b] for Sony-Only Smartphones	A400-A414
17.	Compilation of Wright Report Exhibits Concerning '029 Patent, Claim Element 14[c] for Sony-Only Digital Cameras	A415-A745
18.	Compilation of Wright Report Exhibits Concerning '029 Patent, Claim Element 14[c] for Sony-Only Smartphones	A746-A789
19.	September 24, 2015 Letter from Samsung to Imperium (SAM-1059_000053399)	A790-A792
20.	September 28, 2015 Letter from Imperium to Samsung (SAM-1059_000053401)	A793-A796
21.	Notice of Asserted Claims, <i>Imperium v. Samsung</i> , No. 14cv371 (E.D. Tex. Nov 25, 2015)	A798-A801
22.	Samsung's July 20, 2015 Responses and Supplemental Responses and Objections to Imperium's First and Second Set of Interrogatories, Attachment A (7-20-15)	A802-A812
23.	Excerpts from Deposition Transcript of Cameron H.G. Wright (Oct. 22, 2015)	A813-A826
24.	Excerpt from User Manual, Galaxy Note 2 (SAM-371_00044608)	A827-A832
25.	Excerpt from User Manual, Galaxy Note 3 (SAM-371_00044744)	A833-A838
26.	Excerpt from User Manual, Galaxy Note 4 (SAM-371_00044901)	A839-A845
27.	Excerpt from User Manual, Galaxy Note Edge (SAM-371_00045028)	A846-A852
28.	Excerpt from User Manual, Galaxy S5 (SAM-371_00046662)	A853-A861
29.	Excerpts from Expert Report of Kenneth Parulski Regarding Sony Image Sensors in Samsung Products (Dec. 18, 2020)	A862-A881



<b>30.</b>	Excerpts from the Transcript of Trial, <i>Imperium IP Holdings (Cayman), Ltd. v. Samsung Elecs. Co., Ltd.</i> , No. 4:14-cv-00371, February 2, 2016 (Direct Examination of Wright Concerning '029 Patent)	A882-A891
<b>31.</b>	Excerpts from Expert Report of J. David Cabello Regarding The Sony License Agreement and Damages (Dec. 18, 2020)	A892-A909
<b>32.</b>	Excerpts from the Errata to Expert Report of J. David Cabello Regarding The Sony License Agreement and Damages (Feb. 8, 2021)	A910-A915

**A. The Imperium-Sony Settlement**

1. In 2011, Imperium sued Sony Ericsson Mobile Communications (USA) Inc. in the Eastern District of Texas, claiming patent infringement. A002-03.<sup>1</sup>

2. In May 2013, Imperium and Sony Mobile (and its parent, Sony Corporation) settled that litigation by executing the Settlement and License Agreement (“SLA”). A006.

3. Pursuant to the SLA, Sony Mobile paid Imperium [REDACTED], while Sony Corporation paid an additional [REDACTED] to obtain a license, release and covenants relating to Imperium’s patents. A010 (§ 3.1).

4. On January 29, 2021, this Court held that “Samsung is a third-party beneficiary of the SLA.” A030 (58:7-8).

5. In the SLA:

- a. “Licensor” means Imperium. A007.
- b. “Licensed Products” include Sony image sensors. A007.
- c. “Licensed Patents” include U.S. Patent No. 7,092,029 (the “’029 patent”). A007, A020-22.
- d. The “License” provision recites in part: “Licensee Third Parties are licensed under [the SLA] if and only to the extent they ... use ... Licensed Products ... with respect to such Licensed Products.” A008 (§ 2.1).

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<sup>1</sup> Exhibits supporting Samsung’s Motion for Partial Summary Judgement are compiled in the attached appendix (cited as “A[number]”).

- e. The “Covenant Not to Assert or Enjoin” of Section 2.6 recites in part:

Licensors, on behalf of itself, and its successors and assigns, further covenants not to rely on any Licensed Product or the exploitation thereof (in whole or in part) to satisfy any element of any claim of the Licensed Patents.

A009 (§ 2.6).

**B. Imperium’s Assertion of the ’029 Patent Against Samsung**

6. On June 9, 2014, Imperium sued Samsung in the Eastern District of Texas (“Texas Action”), alleging infringement of the ’029 patent and two other patents. A042-46.

7. The Expert Report of Cameron H.G. Wright Concerning Infringement By Samsung (“Wright Rpt.”) includes Dr. Wright’s infringement opinions that various Samsung products infringe claims 1, 6, 7, 14, and 16 of the ’029 patent. A075-76, A078-115. Imperium relied on these opinions in the litigation, including at trial. A884-885 (84:23-85:17); *see generally* A886-891.

8. In a September 24, 2015 letter, Samsung told Imperium that [REDACTED] Imperium was violating the SLA and requested that Imperium [REDACTED]

[REDACTED]

[REDACTED]  
[REDACTED] A791-92.

9. In a September 28, 2015 letter, Imperium told Samsung that it [REDACTED]  
[REDACTED]

A794-95.

10. On November 25, 2015, less than three months prior to trial, Imperium filed a Notice of Asserted Claims and Accused Products to “narrow [the] case for trial.” A799-800. With that notice, Imperium dropped claims 14 and 16 of the ’029 patent. *See id.*

### **1. The Accused Products**

11. In his infringement report, Imperium’s Dr. Wright accused 75 digital cameras and 18 smartphones of infringing the ’029 patent. A078-083.

12. As shown in Attachment A to Samsung’s interrogatory responses in the Texas Action (“Attachment A”), these 75 accused digital cameras each contain one image sensor. A808-812; *see also* A080-82; A822-23 (261:25-262:7). In 41 of these digital cameras, the image sensor is a Sony image sensor. A808-812 (highlighting in yellow accused digital cameras with a Sony image sensor); *see also* A865-870.

13. The 18 accused smartphones contain two image sensors: one for the “Main Camera” (i.e., rear camera) and one for the “VT Camera” (i.e., front camera). A808-09 (Attachment A); *see also* A079; A822-23 (261:25-262:7).

14. Imperium’s Dr. Wright admitted that if a camera does not have a supplemental lighting source (e.g., a flash), it cannot infringe the ’029 patent and was not accused of infringing that patent. A819 (248:21-249:14).

15. Only the main (rear) cameras in the 18 accused smartphones have a flash. *See, e.g.*, A832 (Galaxy Note 2 User Manual); A838 (Galaxy Note 3 User Manual); A844-45 (Galaxy Note 4 User Manual), A851-52 (Galaxy Note Edge User Manual); A858-61 (Galaxy S5 User Manual); *see also* A819 (248:9-249:14). Of these 18 smartphones, 5 contain only a Sony image sensor for the main camera. A808-09 (Attachment A) (highlighting in blue accused smartphones with a Sony image sensor in the main camera); *see also* Appx865-870. Imperium accused only the main cameras of these smartphones, each of which has a flash, of infringing the ’029 patent. A178-188; A404-414; *see also* A819-20 (247:22-248:2, 249:9-250:9).

## **2. Imperium’s Allegations Regarding Claims 14 and 16**

16. Imperium’s Dr. Wright opined that the 41 digital cameras with only Sony sensors and 5 smartphones with Sony sensors in the main camera (collectively, “Sony-Only products”) infringe claims 14 and 16 of the ’029 patent.

A078-082, A105-115 (Wright Rpt.); *see also* A289-A789 (Wright Rpt. Exs., claim 14).

17. Claim 14 (and dependent claim 16) recites “[a] digital imaging system” (element 14[a]) with “a processor electrically connected to a strobe” (element 14[b]) and with “*an image sensor* coupled to a memory, where a supplemental strobe duration stored in the memory is generated from a preparatory image received at the processor from *the image sensor* when the strobe is activated to generate a preparatory light for a predetermined preparatory duration ....” (element 14[c]). A066 (14:1-12, 14:20).

18. Imperium’s Dr. Wright opined for element 14[b] that each Sony-Only product is equipped with a flash and thus “contains a strobe.” A347-414 (Wright Rpt. Exs., element 14[b]). The Sony-Only smartphones include two cameras. Dr. Wright relied on materials that disclose a flash (i.e., a strobe) associated with the main camera (i.e., the camera with a Sony sensor) of the smartphone. A404-414 (Wright Rpt. Exs., element 14[b]).

19. Imperium’s Dr. Wright admitted that practice of claim 14 “requires an image sensor.” A821 (256:24-257:6); *see also* A825 (273:6-11).

20. Imperium’s infringement proof for the “image sensor” of element 14[c] relied on the image sensors incorporated in the Sony-Only products. A419-789 (Wright Rpt. Exs., element 14[c]).

21. Imperium’s proof that each Sony-Only product accused of infringing claims 14 and 16 of the ’029 patent contains an image sensor relied on Attachment A. A293-342 (Wright Rpt. Exs., element 14[a]) (citing Attachment A); *see also* A419-789 (Wright Rpt. Exs., element 14[c]) (“As shown under element 14[a] above ....”).

22. Attachment A identifies only a Sony image sensor for the 41 digital camera Sony-Only products. A808-812 (yellow highlighting).

23. For the 5 smartphone Sony-Only products, Imperium’s proof relied on the image sensor incorporated in the main camera. A404-414 (Wright Rpt. Exs., element 14[b]); *see also supra* ¶ 18; A819 (Wright Dep. Tr. at 248:21-249:14). Attachment A identifies only a Sony image sensor for the main camera of these smartphone Sony-Only products. A808-09 (blue highlighting).

### **3. Imperium’s Allegations Regarding Claims 1 and 6**

24. Imperium’s Dr. Wright opined that the Sony-Only products infringe claims 1 and 6 of the ’029 patent. A078-101 (Wright Rpt.); *see also* A117-288 (Wright Rpt. Exs., claim 1).

25. Claim 1 (and dependent claim 6) recites “[a] method of adjusting image lighting” (element 1[a]) and requires “generating a preparatory light ...” (element 1[b]) and “*capturing a preparatory image* while generating the preparatory light....” (element 1[c]). A065 (11:40-57).

26. The '029 patent discloses that an image sensor captures (i.e., acquires) the preparatory image: “an image sensor acquires a preparatory image.” A049 ('029 patent, Abstract).

27. Samsung's expert, Kenneth Parulski, opined that it is impossible to capture a preparatory image without using an image sensor. A878 (¶¶ 131-32).

28. Imperium's Dr. Wright admitted that for a product to practice claim 1, “you would need some sort of digital imaging sensor” and confirmed that if a product does not have an image sensor, it cannot infringe the '029 patent. A821 (256:17-257:6); A823 (264:25-265:12).

29. For each Sony-Only product, Imperium's Dr. Wright opined for element 1[a] that the product is equipped with a flash. A121-188 (Wright Rpt. Exs., claim element 1[a]). For the 5 smartphones, Dr. Wright cited to materials that disclose a flash associated with the main (rear) camera (i.e., the camera that uses a Sony sensor) of the smartphone. A178-188.

30. For each Sony-Only product, Imperium's Dr. Wright opined for element 1[c] (“capturing a preparatory image”) that [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

A193-288 (Wright Rpt. Exs., claim element 1[c]).



31. For the digital cameras, Attachment A identifies the product as incorporating only a Sony image sensor. A808-812 (yellow highlighting). For the smartphones, Attachment A identifies the product as incorporating only a Sony image sensor for the main (i.e., rear, with a flash) camera. A808-809 (blue highlighting).

**C. Damages**

32. Samsung incurred litigation fees and costs in this action relating to its breach claims and in the Texas Action relating to the SLA and in defending Sony-only products as to the '029 patent. A898-99 (¶¶ 84-85); A902-07 (¶¶ 193-199, 210-214).

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**CERTIFICATION OF COMPLIANCE WITH TYPEFACE  
REQUIREMENT AND TYPE-VOLUME LIMITATION**

I hereby certify that the foregoing Concise Statement of Fact complies with the word count limitations of this Court's standing scheduling order because this document contains 1,499 words. This brief complies with the type and font limitations of this Court's standing scheduling order because it has been prepared in a proportionally spaced typeface using Microsoft Word in 14-point Times New Roman font.

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IN THE UNITED STATES DISTRICT COURT  
FOR THE DISTRICT OF DELAWARE

SAMSUNG ELECTRONICS CO., LTD.,	)	
	)	
Plaintiff,	)	
	)	
v.	)	C.A. No. 15-1059-CFC
	)	
IMPERIUM IP HOLDINGS (CAYMAN),	)	
LTD.,	)	
	)	
Defendant.	)	

**DECLARATION OF KATHRYN C. THORNTON IN SUPPORT OF  
SAMSUNG’S MOTION FOR PARTIAL SUMMARY JUDGMENT**

I, Kathryn C. Thornton, herby declare:

1. I am an associate at the law firm of Ropes & Gray LLP (“Ropes & Gray”) and counsel for Plaintiff Samsung Electronics, Co., Ltd. (“Samsung”) in the above-captioned matter. I am over the age of 18 and make this declaration based on my personal knowledge.

2. Attached as **Exhibit 1** is a true and correct copy of excerpted portions of the Complaint in *Imperium (IP) Holdings, Inc. v. Apple et al.*, Case No. 11-cv-163, filed in the Eastern District of Texas on March 30, 2011. Highlighting has been added for the convenience of the Court.

3. Attached as **Exhibit 2** is a true and correct copy of the “Settlement and License Agreement” between Imperium and Sony Mobile Communications

(USA) Inc. (*formerly known as* Sony Ericsson Mobile Communications (USA) Inc.) and Sony Corporation, executed May 2013, and produced by Imperium bearing production numbers IIPH\_SAM00364017–IIPH\_SAM00364037. Highlighting has been added for the convenience of the Court.

4. Attached as **Exhibit 3** is a true and correct copy of excerpted portions of the transcript of this Court’s January 29, 2021 hearing concerning Imperium’s motion to transfer and Samsung’s motion for preliminary injunction. Highlighting has been added for the convenience of the Court.

5. Attached as **Exhibit 4** is a true and correct copy of excerpted portions of Defendant Imperium IP Holdings (Cayman), Ltd.’s Answers and Objections to First Set of Requests for Admission, dated February 1, 2021. Highlighting has been added for the convenience of the Court.

6. Attached as **Exhibit 5** is a true and correct copy of excerpted portions of the Complaint in *Imperium IP Holdings (Cayman), Ltd. v. Samsung Elecs. Co., Ltd. et al.*, Case No. 14-cv-371, filed in the Eastern District of Texas on June 9, 2014 (the “Texas Action”). Highlighting has been added for the convenience of the Court.

7. Attached as **Exhibit 6** is a true and correct copy of U.S. Patent No. 7,092,029 (“the ’029 patent”). Highlighting has been added for the convenience of the Court.

8. Attached as **Exhibit 7** is a true and correct copy of Imperium's Patent Rule 3-1 and 3-2 Disclosures in the Texas Action, dated January 26, 2015.

Highlighting has been added for the convenience of the Court.

9. Attached as **Exhibit 8** is a true and correct copy of excerpted portions of the "Expert Report of Cameron H.G. Wright Concerning Infringement by Samsung," dated September 9, 2015, from the Texas Action. Highlighting has been added for the convenience of the Court.

10. Attached as **Exhibit 9** is a true and correct copy of compiled excerpted portions of the claim chart exhibits concerning infringement of the '029 patent, claim element 1[a], by Samsung's accused digital cameras containing a Sony image sensor, attached to the "Expert Report of Cameron H.G. Wright Concerning Infringement by Samsung." Highlighting has been added for the convenience of the Court.

11. Attached as **Exhibit 10** is a true and correct copy of compiled excerpted portions of the claim chart exhibits concerning infringement of the '029 patent, claim element 1[a], by Samsung's accused smartphones containing a Sony image sensor in the Main Camera, attached to the "Expert Report of Cameron H.G. Wright Concerning Infringement by Samsung." Highlighting has been added for the convenience of the Court.

12. Attached as **Exhibit 11** is a true and correct copy of compiled excerpted portions of the claim chart exhibits concerning infringement of the ‘029 patent, claim element 1[c], by Samsung’s accused digital cameras containing a Sony image sensor, attached to the “Expert Report of Cameron H.G. Wright Concerning Infringement by Samsung.” Highlighting has been added for the convenience of the Court.

13. Attached as **Exhibit 12** is a true and correct copy of compiled excerpted portions of the claim chart exhibits concerning infringement of the ‘029 patent, claim element 1[c], by Samsung’s accused smartphones containing a Sony image sensor in the Main Camera, attached to the “Expert Report of Cameron H.G. Wright Concerning Infringement by Samsung.” Highlighting has been added for the convenience of the Court.

14. Attached as **Exhibit 13** is a true and correct copy of compiled excerpted portions of the claim chart exhibits concerning infringement of the ‘029 patent, claim element 14[a], by Samsung’s accused digital cameras containing a Sony image sensor, attached to the “Expert Report of Cameron H.G. Wright Concerning Infringement by Samsung.” Highlighting has been added for the convenience of the Court.

15. Attached as **Exhibit 14** is a true and correct copy of compiled excerpted portions of the claim chart exhibits concerning infringement of the ‘029



patent, claim element 14[a], by Samsung's accused smartphones containing a Sony image sensor in the Main Camera, attached to the "Expert Report of Cameron H.G. Wright Concerning Infringement by Samsung." Highlighting has been added for the convenience of the Court.

16. Attached as **Exhibit 15** is a true and correct copy of compiled excerpted portions of the claim chart exhibits concerning infringement of the '029 patent, claim element 14[b], by Samsung's accused digital cameras containing a Sony image sensor, attached to the "Expert Report of Cameron H.G. Wright Concerning Infringement by Samsung." Highlighting has been added for the convenience of the Court.

17. Attached as **Exhibit 16** is a true and correct copy of compiled excerpted portions of the claim chart exhibits concerning infringement of the '029 patent, claim element 14[b], by Samsung's accused smartphones containing a Sony image sensor in the Main Camera, attached to the "Expert Report of Cameron H.G. Wright Concerning Infringement by Samsung." Highlighting has been added for the convenience of the Court.

18. Attached as **Exhibit 17** is a true and correct copy of compiled excerpted portions of the claim chart exhibits concerning infringement of the '029 patent, claim element 14[c], by Samsung's accused digital cameras containing a Sony image sensor, attached to the "Expert Report of Cameron H.G. Wright

Concerning Infringement by Samsung.” Highlighting has been added for the convenience of the Court.

19. Attached as **Exhibit 18** is a true and correct copy of compiled excerpted portions of the claim chart exhibits concerning infringement of the ‘029 patent, claim element 14[c], by Samsung’s accused smartphones containing a Sony image sensor in the Main Camera, attached to the “Expert Report of Cameron H.G. Wright Concerning Infringement by Samsung.” Highlighting has been added for the convenience of the Court.

20. Attached as **Exhibit 19** is a true and correct copy of a letter from counsel for Samsung, Samuel L. Brenner, to counsel for Imperium, Silvia Jordan, on September 24, 2015, produced by Samsung bearing production numbers SAM-1059\_000053399 to SAM-1059\_000053400. Highlighting has been added for the convenience of the Court.

21. Attached as **Exhibit 20** is a true and correct copy of a letter from counsel for Imperium, R. William Sigler, to counsel for Samsung, Samuel L. Brenner, on September 28, 2015, produced by Samsung bearing production numbers SAM-1059\_000053401 to SAM-1059\_000053403. Highlighting has been added for the convenience of the Court.

22. Attached as **Exhibit 21** is a true and correct copy of Imperium’s Notice of Asserted Claims and Accused Products, filed on November 25, 2015.

(Texas Action D.I. 170). Highlighting has been added for the convenience of the Court.

23. Attached as **Exhibit 22** is a true and correct copy of excerpted portions of Samsung's July 20, 2015 Responses and Supplemental Responses and Objections to Imperium's First and Second Set of Interrogatories (Nos. 1-17) in the Texas Action, including Attachment A (7-20-15). Highlighting has been added for the convenience of the Court. Yellow highlighting in Attachment A identifies Samsung's accused digital cameras containing only a Sony image sensor and blue highlighting identifies Samsung's accused smartphones containing only a Sony image sensor in the Main Camera.

24. Attached as **Exhibit 23** is a true and correct copy of excerpted portions of the transcript of the October 22, 2015 deposition of Cameron H.G. Wright in the Texas Action. Highlighting has been added for the convenience of the Court.

25. Attached as **Exhibit 24** is a true and correct copy of excerpted portions of the User Manual for the Galaxy Note 2, produced by Samsung bearing production numbers SAM-371\_00044608 to SAM-371\_00044743. Highlighting has been added for the convenience of the Court.

26. Attached as **Exhibit 25** is a true and correct copy of excerpted portions of the User Manual for the Galaxy Note 3, produced by Samsung bearing

production numbers SAM-371\_00044744 to SAM-371\_00044900. Highlighting has been added for the convenience of the Court.

27. Attached as **Exhibit 26** is a true and correct copy of excerpted portions of the User Manual for the Galaxy Note 4, produced by Samsung bearing production numbers SAM-371\_00044901 to SAM-371\_00045027. Highlighting has been added for the convenience of the Court.

28. Attached as **Exhibit 27** is a true and correct copy of excerpted portions of the User Manual for the Galaxy Note Edge, produced by Samsung bearing production numbers SAM-371\_00045028 to SAM-371\_00045161. Highlighting has been added for the convenience of the Court.

29. Attached as **Exhibit 28** is a true and correct copy of excerpted portions of the User Manual for the Galaxy S5, produced by Samsung bearing production numbers SAM-371\_00046662 to SAM-371\_00046861. Highlighting has been added for the convenience of the Court.

30. Attached as **Exhibit 29** is a true and correct copy of excerpted portions of the “Expert Report of Kenneth Parulski Regarding Sony Image Sensors in Samsung Products,” dated December 18, 2020. Highlighting has been added for the convenience of the Court.

31. Attached as **Exhibit 30** is a true and correct copy of excerpted portions of the transcript of trial testimony in the Texas Action, specifically

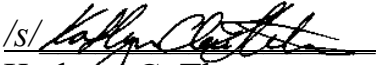
portions of the direct examination of Cameron H.G. Wright from the morning and afternoon sessions on February 2, 2016. Highlighting has been added for the convenience of the Court.

32. Attached as **Exhibit 31** is a true and correct copy of excerpted portions of the “Expert Report of J. David Cabello Regarding the Sony License Agreement and Damages,” dated December 18, 2020. Highlighting has been added for the convenience of the Court.

33. Attached as **Exhibit 32** is a true and correct copy of excerpted portions of the “Errata to Expert Report of J. David Cabello Regarding the Sony License Agreement and Damages,” dated February 8, 2020 [sic].

I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct.

Executed on March 8, 2021

/s/   
Kathryn C. Thornton

# **EXHIBIT 1**

**IN THE UNITED STATES DISTRICT COURT  
FOR THE EASTERN DISTRICT OF TEXAS  
SHERMAN DIVISION**

**IMPERIUM (IP) HOLDINGS, INC.,**

**Plaintiff,**

**v.**

**APPLE INC.,  
KYOCERA COMMUNICATIONS, INC.,  
LG ELECTRONICS U.S.A., INC.,  
LG ELECTRONICS MOBILECOMM  
U.S.A., INC.,  
MOTOROLA MOBILITY HOLDINGS,  
INC.,  
NOKIA, INC.,  
RESEARCH IN MOTION CORPORATION,  
and  
SONY ERICSSON MOBILE  
COMMUNICATIONS (USA), INC.,**

**Defendants.**

**Case No. \_\_\_\_\_**

**JURY TRIAL DEMANDED**

**COMPLAINT FOR PATENT INFRINGEMENT**

Plaintiff Imperium (IP) Holdings, Inc. files this **Complaint for Patent Infringement** **against** Defendants Apple Inc.; Kyocera Communications, Inc.; LG Electronics U.S.A., Inc.; LG Electronics Mobilecomm U.S.A., Inc.; Motorola Mobility Holdings, Inc.; Nokia, Inc.; Research in Motion Corporation; and **Sony Ericsson Mobile Communications (USA), Inc.** (collectively “the Defendants”) and alleges as follows:

**THE PARTIES**

1. Plaintiff Imperium (IP) Holdings, Inc. (“IIPH”) is a Cayman Islands corporation having a place of business at 515 Madison Avenue, New York, NY 10022.

to the Voyager VX10000 cell phone, throughout the United States, including in this judicial district.

63. Nokia has infringed, and continues to infringe, one or more claims of the '535 Patent in violation of 35 U.S.C. § 271(a) by manufacturing, using, selling, offering for sale, and/or importing cell phones and/or other devices with image sensors, including, but not limited to the Surge 6790 cell phone, throughout the United States, including in this judicial district.

64. IIPH has been damaged and continues to be damaged by Apple's, LG's, and Nokia's infringement of the '535 Patent.

#### **PRAYER FOR RELIEF**

WHEREFORE, IIPH demands judgment against Defendants, including its affiliates, officers, agents, servants, employees, and all persons in active concert or participation with them, as follows:

A. An award to IIPH of such damages under 35 U.S.C. § 284 as it shall prove against the Defendants for infringement of the '884 Patent, '651 Patent, '715 Patent, '768 Patent and '535 Patent, together with pre-judgment and post-judgment interest;

B. A permanent injunction prohibiting Apple, Kyocera, LG, Motorola, Nokia, RIM and Sony Ericsson from further acts of infringement of the '884 Patent, '651 Patent, '715 Patent, '768 Patent and '535 Patent;

C. An award to IIPH of the costs of this action and its reasonable attorneys' fees pursuant to 35 U.S.C. § 285; and

D. Such other and further relief as this Court may deem just and appropriate.



**JURY DEMAND**

Pursuant to Rule 38(b) of the Federal Rules of Civil Procedure, IIPH demands a trial by jury.

Respectfully submitted,

Date: March 30, 2011

/s/ Alan M Fisch  
Alan M. Fisch  
KAYE SCHOLER LLP  
The McPherson Building  
901 Fifteenth Street, NW  
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Email: alan.fisch@kayescholer.com

*Attorney for Imperium (IP) Holdings, Inc.*

# **EXHIBIT 2**

## **Redacted in its Entirety**

# **EXHIBIT 3**

IN AND FOR THE DISTRICT OF DELAWARE

— — —

**Defendant. : NO. 15-1059-CFC-CJB**

— — —

\_\_\_\_\_

— — —

-and-

**A028**

<p style="text-align: center;">2</p> <p>1 APPEARANCES (Continued):</p> <p>2</p> <p>3 ROPES &amp; GRAY LLP</p> <p>4 BY: DOUGLAS HALLWARD-DRIEMEIER, ESQ.</p> <p>5 (Washington, D.C.)</p> <p>6 -and-</p> <p>7 ROPES &amp; GRAY LLP</p> <p>8 BY: STEEN PEPE, ESQ.</p> <p>9 (New York, New York)</p> <p>10 Counsel for Plaintiff</p> <p>11 STRADLEY RONON STEVENS &amp; YOUNG, LLP</p> <p>12 BY: JOELLE E. POLESKY, ESQ.</p> <p>13 -and-</p> <p>14 POTOMAC LAW GROUP</p> <p>15 BY: GREGORY L. EWING, ESQ.</p> <p>16 (Washington, D.C.)</p> <p>17 Counsel for Defendant</p> <p>18 - - -</p> <p>19</p> <p>20</p> <p>21</p> <p>22</p> <p>23</p> <p>24</p> <p>25</p>	<p style="text-align: center;">4</p> <p>1 vice was moved more recently.</p> <p>2 THE COURT: Was it granted?</p> <p>3 MR. HALLWARD-DRIEMEIER: I believe so.</p> <p>4 THE COURT: Okay. All right. Thank you.</p> <p>5 Is Ms. Poelsky on the phone?</p> <p>6 MS. POELSKY: Yes, Your Honor. Good morning.</p> <p>7 Joelle Poelsky of Stradley Ronon on behalf of Imperium,</p> <p>8 and appearing is my co-counsel, Gregory Ewing from Potomac</p> <p>9 Law who has been admitted pro hac vice, and with Your</p> <p>10 Honor's permission, he will present the argument. As well,</p> <p>11 we have Vince Capone, who is general counsel of</p> <p>12 Pictos/Imperium.</p> <p>13 THE COURT: All right. Great. Thank you.</p> <p>14 MS. POLESKY: Thank you, Your Honor.</p> <p>15 THE COURT: I was a little bit late because I</p> <p>16 got the e-mail from you all at 9:56. Frankly, I'm not sure</p> <p>17 it clears things up at least in my brain, but I have not had</p> <p>18 too much time to digest it.</p> <p>19 Let's do this. Let's begin with the transfer</p> <p>20 motion.</p> <p>21 MR. EWING: Thank you, Your Honor. This is --</p> <p>22 THE COURT: Go ahead.</p> <p>23 MR. EWING: This is Greg Ewing on behalf of</p> <p>24 Imperium.</p> <p>25 THE COURT: All right.</p>
<p style="text-align: center;">3</p> <p>1 P R O C E E D I N G S</p> <p>2</p> <p>3 (The following telephone conference was held</p> <p>4 beginning at 10:10 a.m.)</p> <p>5</p> <p>6 THE COURT: All right. Good morning. Counsel,</p> <p>7 could we begin with introduction of those who are present.</p> <p>8 We will start with Samsung.</p> <p>9 MR. SHAW: Good morning, Your Honor. This is</p> <p>10 John Shaw for Samsung. Joining me from Ropes &amp; Gray are</p> <p>11 Doug Hallward-Driemeier and Steven Pepe. Mr. Dreimeier will</p> <p>12 be making the argument today.</p> <p>13 And then also joining from Samsung are Daniel</p> <p>14 Girdwood. He's vice president of Samsung America and Justin</p> <p>15 Cho, who is principal legal counsel for Samsung Electronics</p> <p>16 Company Limited.</p> <p>17 THE COURT: All right. I'm sorry, Mr. Shaw.</p> <p>18 Who did you say the first person is going to make the</p> <p>19 argument?</p> <p>20 MR. SHAW: Douglas Hallward-Dreimeier,</p> <p>21 D-r-e-i-m-e-i-e-r.</p> <p>22 THE COURT: All right. I didn't see him on the</p> <p>23 papers.</p> <p>24 MR. HALLWARD-DRIEMEIER: Good morning, Your</p> <p>25 Honor. Thus Doug Hallward-Dreimeier. My admission pro hac</p>	<p style="text-align: center;">5</p> <p>1 MR. EWING: With regard to the transfer motion,</p> <p>2 we believe the core issue here is whether Samsung is a</p> <p>3 third-party beneficiary under the simulations agreement.</p> <p>4 I'm happy to address the arguments as we see</p> <p>5 them, but if Your Honor has particular guidance or areas</p> <p>6 you would like to address, I would be happy to start there.</p> <p>7 THE COURT: Well, okay. Let's begin there.</p> <p>8 What I'm struck by with your motion is, and I wonder whether</p> <p>9 you basically conceded, because other than the two footnotes</p> <p>10 that reference Jumara in your opening brief, and they</p> <p>11 literally just reference it, I don't see any discussion of</p> <p>12 Jumara, and you agree, Jumara is what governs. Is that</p> <p>13 correct?</p> <p>14 MR. EWING: Your Honor, we would agree that the</p> <p>15 Reserves case governs in this instance. That's the standard</p> <p>16 or Insituform of North America v. Chandler.</p> <p>17 THE COURT: Okay. So, wait. What case is</p> <p>18 that?</p> <p>19 MR. EWING: It is Insituform of North America</p> <p>20 Inc. v. Chandler. It's a Delaware Chancery court case</p> <p>21 discussing the standards under Delaware law for third-party</p> <p>22 beneficiary status.</p> <p>23 THE COURT: Okay. So, see, that's where I'm at</p> <p>24 a loss, and it's somewhat ironic to me. You're saying that</p> <p>25 you're not bound by the forum selection clause in the SLA.</p>

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1 venue of the Court over these matters, and so that is  
2 further reason that Imperium should not be heard to object  
3 to this Court's exercise of jurisdiction.

4 THE COURT: All right. Okay. Well, here's how  
5 I'm going to rule then on what I will call the second and  
6 alternative transfer issue.

7 I agree that Samsung is a third-party  
8 beneficiary of the SLA, and when parties have a contract  
9 that contains a valid forum selection clause, the calculus  
10 of the Jumara factors changes under the Supreme Court's  
11 decision in Atlantic Marine. And in that situation, no  
12 weight is given to the plaintiff's choice of forum and the  
13 Court does not consider arguments about the parties' private  
14 interests. The practical results of this analysis under  
15 Atlantic Marine is that a valid forum selection clause  
16 should be given controlling weight in all but the most  
17 exceptional cases.

18 Settled law dictates whether a forum selection  
19 clause will be enforced, and that is under a Third Circuit's  
20 holding in the McGraw-Hill case found at 909 F.3d. 48, but  
21 the scope of a forum selection clause, that is whether the  
22 claims and parties involved in the suit are subject to the  
23 clause, is governed by state law under McGraw-Hill, and I  
24 point you to page 58 of the decision in that regard.

25 Delaware law -- and the parties agree that

1 provisions of the contract to determine whether or not we  
2 can infer from those provisions whether or not Samsung was  
3 an intended third-party beneficiary of the SLA.  
4 Under Delaware law, to establish a third-party  
5 beneficiary status requires a showing of three things --  
6 one, an intent between the contracting parties to benefit  
7 the third party through the contract; two, an intent that  
8 the benefits serve as a gift or in satisfaction of a  
9 pre-existing obligation to the third party; and, three, a  
10 showing that benefiting the third party was a material  
11 aspect to the parties that agreed to the contract. And I  
12 cite in this regard Reserve Development LLC against  
13 Sovereign Savings Bank at 2007 Westlaw, 4054231 at \*18, and  
14 that's a Delaware Chancery Court decision from 2007.

15 Turning first to the first prong, whether  
16 there's an intent to benefit a third party. To satisfy this  
17 element, a plaintiff must demonstrate that the agreement  
18 confers an intended benefit to the plaintiff and show that  
19 it received a direct as opposed to incidental benefit from  
20 the agreement. And to make this determination, the Court  
21 looks to the terms of the contract.

22 I agree with Samsung, that a number of  
23 provisions of the SLA confirm that it was Sony's intention  
24 to confer direct benefits upon its customers, including  
25 Samsung. And let's start with looking at the consideration

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1 Delaware law governs the contract that is at issue here.  
2 And Delaware law allows that a third person who is in effect  
3 a stranger to the contract can enforce a contractual promise  
4 in its own right and name if the contract has been made for  
5 that party's benefit.

6 And I refer you as support for that principle to  
7 the CCC Railcar Service, Inc. case decided by the Delaware  
8 Supreme Court in 1993, and it can be found at 630 A.2d 629  
9 at page 633.

10 If, however, it was not the promisee's intention  
11 to confer direct benefits upon a third person, but rather  
12 such third party happens to benefit from the performance of  
13 the promise either coincidentally or indirectly, then such  
14 third-party beneficiary will be held to have no enforceable  
15 rights under the contract.

16 And there I would direct you to the decision by  
17 the Delaware Chancery Court in 1987 called Insituform  
18 against Chandler, found at 534 A.2d 257, and, in particular,  
19 at page 269.

20 So really, the issue here is going to focus on  
21 whether or not there was an intent for third parties, and,  
22 in particular, Samsung, to benefit from the SLA.

23 Now, the SLA contains a forum selection clause,  
24 which we've discussed, and it's found at Section 6.5.

25 Before I turn to that though, let's talk about other

1 and what we know from the terms of the contract as to how  
2 the contract was entered.

3 For starters, there are three parties to the  
4 agreement. There, of course, is Imperium, now known as  
5 Pictos. It's one party.

6 On the other side of the ledger are two Sony  
7 entities. One is Sony Mobile Communications USA, Inc., and  
8 that was the defendant in the Texas case.

9 The other party is Sony Corp., which is, of  
10 course, the Japanese holding and main company in Japan, and  
11 that is referred to in the SLA as Sony.

12 Now, the recitals establish that the contract  
13 was entered after a mediation between Sony Mobile, the  
14 defendant, and Imperium, and it was made after the mediator  
15 had proposed a settlement of the litigation [REDACTED]

16 [REDACTED] And that's found at appendix page 3 of  
17 DI 125.

18 Now, it is then informative to turn to Section 3  
19 of the SLA titled Additional Considerations, and, in  
20 particular, to Section 3.1, which is title Payment. And  
21 here, the total consideration that the two Sony entities  
22 paid is described, and really, it breaks down to  
23 consideration in really two payments or two forms.

24 The first is that Sony Mobile as the licensee  
25 agreed to pay Imperium a total of [REDACTED], and so when you

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1 consider that with respect to the recital at appendix page 3  
 2 that I read recital, that's referring to effectively, what  
 3 was paid to settle the litigation. But, in addition, the  
 4 second we see under the payment section of 3.1 that Sony --  
 5 and that, of course, is the Japanese overarching entity, it  
 6 agreed to pay the licensor a total of [REDACTED] And,  
 7 of course, Sony was not a party to the litigation, and it's  
 8 clear from this provision and some of the other provisions  
 9 I'm about to read that this additional amount of  
 10 consideration, [REDACTED] was paid for licenses, and not  
 11 only a license for Sony, but as we will see, licenses for  
 12 third parties.

13 The next provision of the contract that's  
 14 relevant to intent is Section 2.1 of the SLA, which is  
 15 entitled "License." And for our purposes, what's important  
 16 is that a sentence in that section reads that Licensee Third  
 17 Parties -- and that term is a defined term of the contract.  
 18 It's capitalized, Licensee Third Parties.

19 And Section 2.1 provides that Licensee Third  
 20 Parties are licensed under the agreement if and only to the  
 21 extent they do certain things, and one of those things is  
 22 that they "use licensed products and covered third-party  
 23 products with respect to such licensed products or covered  
 24 third-party products." And licensed products is a defined  
 25 term in the contract as is covered third-party products.

1 Licensed product is a defined term in the SLA.  
 2 It's defined at page 2 and it means "any past, present and  
 3 future products, product lines, services, devices, systems,  
 4 components, network, hardware, software, method, process,  
 5 functionality, feature, technology, instruction or other  
 6 instrumentality or any combination of the foregoing and  
 7 other offering of licensee."

8 So basically, it would mean for our purposes any  
 9 product made by the licensee, and we're talking about any  
 10 Sony-made product.

11 So when you read all of those definitions  
 12 together with Section 2.1, it's clear that the parties to  
 13 the SLA intended to confer a license, albeit a limited  
 14 license, that would extend to third parties and that would  
 15 cover those third parties to the extent they used Sony  
 16 products.

17 In addition, Section 2.2 shows that the parties  
 18 to the SLA intended to confer benefits on licensees or third  
 19 parties. That provision, which I'm not going to read into  
 20 the record, but it can be found at page 3 of the SLA at  
 21 Appendix 5 of DI 125, and it confers a broad release on the  
 22 licensee third parties for using either the licensed  
 23 products or the covered third-party products.

24 There is in addition Section 2.6 of the SLA,  
 25 which is a very broad covenant not to assert or enjoin, and

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1 And so what this reference that I've just  
 2 referenced effectively conferred is a license to third  
 3 parties who use licensed products and covered third products  
 4 with respect to those products.

5 Now, as I mentioned, licensee third party is a  
 6 defined term by the SLA and it's defined on page 2 of the  
 7 SLA, and it means, among other things, "purchasers," and,  
 8 "customers and end users of any licensed products or covered  
 9 third-party products, but solely with respect to such  
 10 licensed product or covered third party product."

11 So clearly, then, the SLA is contemplating and  
 12 the parties are intending to confer a license on these third  
 13 parties to the extent they purchase or use either the  
 14 licensed products or covered third-party products.

15 The next relevant provision is the definition of  
 16 a covered third party product, and that is also found at  
 17 page 2 of the SLA. And covered third-party products are  
 18 defined by the SLA to mean one of two things.

19 First, "Third-party products are services  
 20 designed and marketed to operate in conjunction with or  
 21 offer for sale or sold via a licensed product," or, "Two,  
 22 third-party products or services that when running using,  
 23 operating within or otherwise benefiting from the  
 24 functionality of a licensed product is covered by any claim  
 25 of the licensed patent."

1 it provides that, again, reference is made to the covered  
 2 third-party product and to licensed products and it  
 3 basically limits or precludes, I should say, Imperium from  
 4 asserting or making any claim or prosecuting any lawsuit for  
 5 infringement against any entity for infringement of the  
 6 licensed patent with respect to licensed products or covered  
 7 third-party products.

8 Now, what's significant here is that the  
 9 covenant applies to infringement claims brought against "any  
 10 entity." So, again, it's clearly, especially when read in  
 11 light of the provisions of the SLA that I've just discussed,  
 12 it's going beyond the signatories to the SLA and it is  
 13 contemplating there an intent to confer benefits of the SLA  
 14 on third parties.

15 Now, in addition, there is a section which we  
 16 discussed in the argument that is titled excluded parties,  
 17 and it's found at 2.8, and basically, this sentence, or,  
 18 rather, this provision allowed for the identification of  
 19 parties that would be excluded from the third-party benefits  
 20 that are conferred by clauses in the SLA and some of which  
 21 I've already read into the record. And it's undisputed that  
 22 on the list of excluded parties, Samsung was identified.  
 23 However, there is an exception to excluded parties, which is  
 24 relevant to the issue before me, and that is found at the  
 25 last sentence of Section 2.8, and it provides, "Excluded

<p style="text-align: center;">66</p> <p>1 party shall not however include any licensee third-party  2 with respect to licensed products or covered third-party  3 products regardless of whether or not they are included in  4 Subsections 1 through 3 of this Subsection 2.8." And let me  5 pause for a second and say that those subsections are  6 referring to the lists or the schedules on which the  7 excluded parties, including Samsung, were identified.  8 So then going back to the text of the last  9 sentence, in a parenthetical is written the following. "By  10 way of example and not of limitation, an entity which is a  11 purchaser or end user of a Sony imaging sensor is not an  12 excluded party with respect to that Sony imaging sensor."  13 And so what the effect of that last sentence,  14 and, in particular, what's made clear by the parenthetical I  15 just read is that even if an entity such as Samsung were to  16 be listed in one of the schedules that is connected to  17 Section 2.8 of excluded party, those entities, including  18 Samsung, are not deemed to be excluded from third-party  19 beneficiary status to the extent they are a purchaser of a  20 Sony imaging sensor.  21 So here again that language manifests an intent  22 by the parties to confer on third parties, and, in  23 particular, Samsung, beneficiary status and to derive a  24 benefit from the SLA. And because it's undisputed that  25 Samsung was a purchaser of licensed products, it qualifies</p>	<p style="text-align: center;">68</p> <p>1 United Rentals case found at 9307 A.2d 810, and the  2 Community Association Underwriters case, found at 488 Fed.  3 Appx. 547, none of those cases explicitly ruled on  4 disclaimers.  5 The other three cases cited by Imperium cited  6 disclaimers that did not have exceptions such as we have in  7 this case, and those three cases are the Peershellens case,  8 found at 2003 Westlaw 21649926, the E.I. DuPont de Nemours  9 case, found at 269 F3d. 0187, and the Empire Fire and Marine  10 Insurance case, found at 2012 Westlaw 1151031.  11 I should add that even if Section 6.7 had not  12 excepted the additional rights that were expressly provided  13 in the agreement, the clear rights granted to qualifying  14 third parties in Sections 2.1, 2.2, 2.6 and 2.8 would still  15 control.  16 Under Delaware law, it's well settled that rules  17 of contract construction require that a contract be  18 construed as a whole giving effect to the parties'  19 intention, and specific language in a contract controls over  20 general language, and where specific and general provisions  21 conflict, the specific provision ordinarily qualifies the  22 meaning of the general one. And I point you in this regard  23 to the DCB Holdings case of the Delaware Supreme Court,  24 found at 889 A2d, 954.  25 And so therefore, where as in this case, we have</p>
<p style="text-align: center;">67</p> <p>1 as a licensee to this party under the definition provided in  2 the contract, and when read with the provisions that I've  3 just discussed, I do think it's clear that the parties to  4 the SLA intended to confer third-party beneficiary status on  5 Samsung.  6 Now, Imperium points to the general disclaimer  7 found at 6.7 of the contract. And it's true that 6.7  8 provides, or I should say is titled "No further license, no  9 third-party rights," but the key to 6.7 for our purposes is  10 the last clause, which reads, "Except as expressly provided  11 in this agreement." So, in other words, it's true, there is  12 a general disclaimer, and if there were nothing but the  13 general disclaimer under Delaware law, it would preclude a  14 determination of the existence of third-party beneficiaries,  15 but the disclaimer is followed by the clause "Except as  16 expressly provided in this agreement," and as I just  17 discussed, there are express provisions in the agreement  18 that apply to third parties generally and, more importantly,  19 they apply to Samsung.  20 Imperium cites a long list of -- rather, not a  21 long list, but it cites a list of cases which it says stand  22 for "longstanding law" that uphold disclaimers of  23 third-party rights, but none of those cases I think are  24 apposite here. Three of the opinions, in particular, the  25 Golvagna case, which is found at 1997 Westlaw, 720463, the</p>	<p style="text-align: center;">69</p> <p>1 a broad provision disclaiming third-party rights, but that  2 conflicts with several specific provisions granting  3 third-party rights, the specific provisions will qualify  4 that broad disclaimer.  5 The case that is most similar perhaps to this  6 case is a Delaware Chancery Court decision titled Amirsaleah  7 against Board of Trade, found at 2008 Westlaw, 4182998. In  8 that case, an agreement contained a general provision that  9 disclaimed any third-party beneficiaries. The Court found  10 that the disclaimer was "belied by the agreement's specific  11 grant of benefits to third parties," and that the plaintiff  12 was seeking to enforce "a right that is specifically and  13 explicitly granted in the contract," and thus the party had  14 standing as a third-party beneficiary. That's what we have  15 in this case.  16 Lastly, Imperium argued that essentially, there  17 has to be an explicit assignment of a third-party  18 beneficiary right in the forum selection clause itself.  19 So, first of all, I don't agree with that as a  20 matter of law, and I refer back to the DCC Holdings case,  21 which requires under Delaware law that the contract be  22 construed as a whole.  23 But, secondly, as I pointed out during the  24 course of the argument, if you look at Section 6.5, which is  25 the forum selection clause itself, it has two clauses that</p>



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1 are relevant, A and B. And B says that the parties to the  
 2 SLA, and only the parties to the SLA, agree to "submit any  
 3 disputes and matters of interpretation and controversies to  
 4 the Delaware Court, but clause A is broader than that and it  
 5 is not limited to the submission by the two signatories or  
 6 the three signatories to the SLA to submit their disputes to  
 7 Delaware courts. It's much broader, and it provides that  
 8 the parties to the SLA agree that "all disputes in  
 9 litigation regarding the agreement are to be submitted to,  
 10 or are to be subject to, rather, the exclusive  
 11 jurisdiction."

12 So I think the fact, if you want to give meaning  
 13 to both clauses, the only way to do it, and you have to do  
 14 this under Delaware construction principles, is to  
 15 understand that the first clause is much broader and it's  
 16 basically applicable to all entities, which would include  
 17 third parties, that they have to bring disputes in  
 18 litigation into a Delaware court, and that would still give  
 19 meaning to the second clause found in Subsection B that  
 20 requires both the Sony parties and Imperium specifically to  
 21 submit their disputes to Delaware courts.

22 So for that reason I find that the first prong  
 23 of the third-party beneficiary analysis under Delaware law  
 24 shows that Samsung was an intended third party.

25 Turning then to the second element, which is an

1 and unambiguous in its conferring of the third-party rights  
 2 shows again that they were material to the SLA.

3 In short, Samsung has satisfied me that all  
 4 three elements requiring Delaware law show that a  
 5 third-party beneficiary exists, and therefore I will apply  
 6 the modified balancing test under Atlantic Marine to  
 7 determine whether this is one of the few "most unusual  
 8 cases" where a forum selection clause does not control.

9 We've already discussed the factors, so I don't  
 10 really need to go over that. I do not think that the public  
 11 interest factors would trump the applicability of a forum  
 12 selection clause and here it's not a most exceptional case  
 13 and therefore I'm going to deny the transfer motion on  
 14 alternative grounds. Namely that the forum selection clause  
 15 does apply and Samsung had standing to invoke the clause and  
 16 the case should reside, or should, rather, should be  
 17 maintained in this district. All right.

18 So now we turn to the preliminary injunction  
 19 motion and I will hear the movant.

20 MR. HALLWARD-DRIEMEIER: Thank you, Your Honor.

21 I'm going to rely, as our papers do, primarily  
 22 on the Federal Circuit's General Protect decision, 651 F3d.  
 23 1355, which also involved an attempt to enforce a forum  
 24 selection clause against a patentee who was asserting an  
 25 infringement action in the ITC, and in that case, the

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1 intent that the benefits serve as a gift or in satisfaction  
 2 of a pre-existing obligation. And here, I think the plain  
 3 language of the SLA shows that Sony negotiated from Imperium  
 4 a license, a release and a covenant not to assert that  
 5 covers Sony's customers.

6 Again, I think if you step back and think about  
 7 it logically, the fact of the consideration is really, it  
 8 consisted of two payments, if you will, and it's the second  
 9 payment, which was made by the Sony Corporation from Japan  
 10 of [REDACTED], shows that there was more intended by the  
 11 agreement than simply a settlement of the Texas litigation.  
 12 And, again, go back and look at Section 2.1, which is  
 13 extending a license to licensee third party; Section 2.2,  
 14 which is extending a release to licensee third parties; and  
 15 then Sections 2.6, which is precluding Imperium from  
 16 asserting infringement against any entity is all evidence  
 17 that the benefits of this SLA not only were extended to  
 18 third parties, but they served as a gift, at the very least.  
 19 They were not coincidental or incidental.

20 Lastly, there has to be a showing that  
 21 benefiting a third party was a material aspect of the  
 22 contract. Here, I think it's very probative that only  
 23 [REDACTED] of the [REDACTED] in consideration was on account  
 24 of the settlement of the litigation. I think that shows  
 25 materiality. I think the fact that the contract was clear

1 Federal Circuit affirmed the district court's injunction,  
 2 ordering the patentee to cease their pursuit of relief  
 3 before the ITC so that the district court that was the  
 4 chosen forum could decide the merits of the parties'  
 5 disagreement about the scope of the license.

6 And Your Honor recited the forum selection  
 7 clause 6.5, and I think you referenced specifically  
 8 provision A as applicable to third-party beneficiaries, and  
 9 it describes all disputes and litigation regarding this  
 10 agreement, its construction and matters connected with  
 11 its performance, and that is very similar to the very broad  
 12 language in the forum selection clause that was at issue  
 13 in General Protect. We said any disputes between the  
 14 parties relating to, arising out of the settlement  
 15 agreement.

16 So what General Protect says in that instance  
 17 where there is that broad a forum selection clause is that  
 18 the party seeking to enforce it does not need to establish  
 19 in order to invoke the forum selection clause and even in  
 20 order to obtain a preliminary injunction against litigation  
 21 in a second forum that the license defense is necessarily  
 22 going to succeed ultimately on the merits, but rather that  
 23 there is a nonfrivolous dispute regarding the patent  
 24 license.

25 And it's that dispute, it's the parties'

<p style="text-align: center;">102</p> <p>1 there doing the same thing, utilizing the claimed</p> <p>2 technology, and they do that on page 156. They point to</p> <p>3 their claim charts with respect to Sony image sensors or</p> <p>4 each of the four asserted patents. For two of the four</p> <p>5 asserted patents, the '145 patent and the '671 patent, the</p> <p>6 only image sensors that Imperium points to that practice the</p> <p>7 asserted patents are Sony image sensors.</p> <p>8 THE COURT: Can you show me where this is again?</p> <p>9 This is 156. I don't see that.</p> <p>10 MR. HALLWARD-DRIEMEIER: These are Exhibit 36 to</p> <p>11 39.</p> <p>12 THE COURT: Hold, on hold on. I'm looking at</p> <p>13 something different. I'm looking at DI 125 at A156. What</p> <p>14 DI number are you?</p> <p>15 MR. HALLWARD-DRIEMEIER: I'm looking at the</p> <p>16 appendix that was submitted. My copy doesn't have a DI</p> <p>17 number. It's appendix in support of Samsung's opening brief</p> <p>18 and support of motion for preliminary injunction.</p> <p>19 THE COURT: Hold on.</p> <p>20 MR. HALLWARD-DRIEMEIER: I think it's DI 125.</p> <p>21 THE COURT: Yes, I have DI 125 and I have the</p> <p>22 same title you do, but at A156 -- okay. I have exhibit</p> <p>23 numbers and they have a description. Is that what you are</p> <p>24 referring to, a list of things here?</p> <p>25 MR. HALLWARD-DRIEMEIER: Yes, Your Honor.</p>	<p style="text-align: center;">104</p> <p>1 the covenant not to sue in, I believe it's Section 2.6 of</p> <p>2 the SLA.</p> <p>3 But, Imperium, maybe I will ask. Imperium,</p> <p>4 you've got this list on A156. I assume that's going to</p> <p>5 disappear based on your representations to this Court.</p> <p>6 MR. EWING: Your Honor, no. In the ITC, to show</p> <p>7 you're a licensee, you have to show a use chart that the</p> <p>8 licensees actually do use your patents. So it's part of the</p> <p>9 domestic industry showing. It has nothing to do with</p> <p>10 infringement.</p> <p>11 THE COURT: All right.</p> <p>12 MR. EWING: I am not seeking infringement based</p> <p>13 on these charts, and you can see that on page -- paragraph</p> <p>14 110, which is page A184.</p> <p>15 THE COURT: Okay. And that actually -- yes. I</p> <p>16 get that. I get that now. So it's not the basis of an</p> <p>17 infringement at all?</p> <p>18 MR. EWING: That is correct, Your Honor.</p> <p>19 THE COURT: Okay.</p> <p>20 MR. EWING: It's based on domestic industry.</p> <p>21 THE COURT: Just to be clear, I did read the</p> <p>22 complaint, the ITC complaint yesterday and I'm looking at it</p> <p>23 again and that's absolutely correct. So, you know, this is</p> <p>24 an example, Samsung, of, I guess, playing a little fast and</p> <p>25 loose here.</p>
<p style="text-align: center;">103</p> <p>1 THE COURT: All right. I'm sorry. Okay. And</p> <p>2 then you are saying that they are using a representative use</p> <p>3 chart of a Sony IMAX series. I see.</p> <p>4 MR. HALLWARD-DRIEMEIER: Right.</p> <p>5 THE COURT: That is the point. That would</p> <p>6 suggest to me that they are asserting an infringement theory</p> <p>7 based on the existence of a Sony image sensor, but you guys</p> <p>8 have agreed that they are not. I mean, that's what I</p> <p>9 thought coming into this. I thought basically, I thought</p> <p>10 I've given you the oral order. I thought you would work out</p> <p>11 some kind of agreement and I could even sign a stipulated</p> <p>12 order that would make it clear that Imperium cannot advance</p> <p>13 any theory in the ITC of infringement based on the existence</p> <p>14 of a Sony product in any of the accused products. That is</p> <p>15 what is the right result in my mind.</p> <p>16 I thought orally, it sounds like you have</p> <p>17 agreed, there is agreement on that. I would agree with you,</p> <p>18 that the exhibit list at A156 certainly seemed to suggest</p> <p>19 that Imperium has maybe taken a different position in the</p> <p>20 past and if you wanted an injunction somehow to say, look,</p> <p>21 they can't go forward and argue a theory of infringement</p> <p>22 based on the existence of a Sony image sensor in the</p> <p>23 product, I think you are right. You should win on that, not</p> <p>24 under a covered third-party product definition, but under a</p> <p>25 licensed product definition, and under the second prong of</p>	<p style="text-align: center;">105</p> <p>1 MR. HALLWARD-DRIEMEIER: I'm --</p> <p>2 THE COURT: You know --</p> <p>3 MR. HALLWARD-DRIEMEIER: My apologies, Your</p> <p>4 Honor. I thought I had made clear that these allegations</p> <p>5 were made with respect to domestic industry. I said that.</p> <p>6 THE COURT: But we've already established that</p> <p>7 that is not -- I believe in my mind, it's not relevant.</p> <p>8 MR. HALLWARD-DRIEMEIER: So --</p> <p>9 THE COURT: The prohibition is very clear that</p> <p>10 Imperium cannot assert a theory of infringement of the</p> <p>11 patents in the ITC based on the existence of a Sony product</p> <p>12 in the Samsung accused product.</p> <p>13 MR. HALLWARD-DRIEMEIER: And --</p> <p>14 THE COURT: And I understand, and somebody needs</p> <p>15 to correct me if I'm wrong, but I understand from the oral</p> <p>16 representations made here today that Imperium is not doing</p> <p>17 that and will not do that and has not done that.</p> <p>18 Is that correct, Imperium?</p> <p>19 MR. EWING: That is correct, Your Honor, and</p> <p>20 it's on page -- in paragraph 47 of our ITC complaint, and</p> <p>21 that is on A170.</p> <p>22 THE COURT: Right.</p> <p>23 MR. HALLWARD-DRIEMEIER: And my point, Your</p> <p>24 Honor, is a slightly different one, which is that Imperium's</p> <p>25 claims in the ITC are self-defeating, because in order to</p>

# **EXHIBIT 4**

**UNITED STATES DISTRICT COURT  
DISTRICT OF DELAWARE**

SAMSUNG ELECTRONICS CO.,  
LTD.,

Plaintiff,

v.

IMPERIUM IP HOLDINGS  
(CAYMAN), LTD.,

Defendant.

Civil Action 15-1059-CFC

**DEFENDANT IMPERIUM IP HOLDINGS (CAYMAN), LTD.’S  
ANSWERS AND OBJECTIONS TO FIRST SET OF REQUESTS FOR ADMISSION**

Defendant Imperium IP Holdings (Cayman), Ltd (“Imperium”) responds and objects as follows to Plaintiff Samsung Electronics Co., Ltd. (“Samsung”) First Set of Requests for Admission (“RFAs”):

**GENERAL OBJECTIONS**

1. Imperium objects to the Interrogatories to the extent that they seek information that is protected from disclosure by the attorney-client privilege, the attorney work product doctrine, or any other recognized privilege.
2. Imperium objects to the RFAs to the extent they seek information and/or documents neither relevant to the claims or defenses in this litigation nor reasonably calculated to lead to the discovery of admissible evidence.
3. Imperium objects to the RFAs to the extent they are overly broad and/or to the extent that such production would be oppressive, unduly burdensome, unreasonably expensive or would require an unreasonable investigation on the part of Imperium.
4. Imperium objects to each instruction, definition, and interrogatory to the extent that it purports to impose any requirement or discovery obligation greater than or different from those

**REQUEST FOR ADMISSION NO. 7.**

Sony sells Sony image sensors to Samsung.

**RESPONSE**

Imperium lacks sufficient knowledge to admit or deny the business relationship between Sony and Samsung as related to how Samsung obtains Sony image sensors.

**REQUEST FOR ADMISSION NO. 8.**

When Imperium and Sony entered into the Sony License Agreement, Sony had been selling Sony image sensors to Samsung.

**RESPONSE**

Imperium lacks sufficient knowledge to admit or deny the type of business relationship between Sony and Samsung as related to how Samsung obtained Sony image sensors when Imperium and Sony entered into the Sony License Agreement.

**REQUEST FOR ADMISSION NO. 9.**

When Imperium and Sony entered into the Sony License Agreement, Imperium was aware that Sony had been selling Sony image sensors to Samsung.

**RESPONSE**

Imperium lacks sufficient knowledge to admit or deny the type of business relationship between Sony and Samsung as related to how Samsung obtained Sony image sensors when Imperium and Sony entered into the Sony License Agreement.

**REQUEST FOR ADMISSION NO. 10.**

The -371 Asserted Patents are Licensed Imperium Patents.

**RESPONSE**

Imperium admits that the -371 Asserted Patents are licensed to Sony under the Sony License Agreement.

**REQUEST FOR ADMISSION NO. 11.**

The -1231 Asserted Patents are Licensed Imperium Patents.

**RESPONSE**

Imperium admits that the -1231 Asserted Patents are licensed to Sony under the Sony License Agreement.

**REQUEST FOR ADMISSION NO. 12.**

Imperium contends that the IMX Series of Sony image sensors identified in the -1231 Investigation practice at least one claim of the Licensed Imperium Patents.

**RESPONSE**

Imperium admits that the IMX Series of Sony image sensors identified in the -1231 Investigation practice at least one claim of the Licensed Imperium Patents.

**REQUEST FOR ADMISSION NO. 13.**

Imperium contended that the ICX Series of Sony image sensors included in some of the -371 Accused Products practice at least one claim of the Licensed Imperium Patents.

**RESPONSE**

Imperium admits that the ICX Series of Sony image sensors practice at least one claim of the Licensed Imperium Patents.

**REQUEST FOR ADMISSION NO. 14.**

Imperium contended that the ISX Series of Sony image sensors included in some of the -

**REQUEST FOR ADMISSION NO. 74.**

In the -371 action, Imperium accused Samsung-Sony products of infringing claims 14 and 16 of the '029 patent.

**RESPONSE**

Denied. *See* January 18, 2016 Notice of Asserted Claims and Accused Products, D.I. 213 in the Texas Action.

**REQUEST FOR ADMISSION NO. 75.**

With respect to Imperium's contention that Samsung infringes claims 14 and 16 of the '029 patent, in his expert report in the -371 action, Dr. Wright relied on Sony image sensors in at least some of the Samsung-Sony products in opining that Samsung products infringed those claims.

**RESPONSE**

Denied.

STRADLEY RONON  
STEVENS & YOUNG, LLP

/s/ Joelle E. Polesky

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*Attorneys for Defendant,  
Imperium IP Holdings (Cayman), LTD.*

Dated: February 1, 2021

UNITED STATES DISTRICT COURT  
DISTRICT OF DELAWARE

SAMSUNG ELECTRONICS CO.,  
LTD.,

Plaintiff,

v.

Civil Action 15-1059-CFC

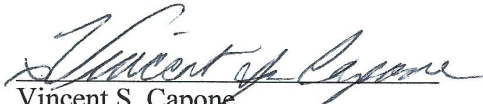
IMPERIUM IP HOLDINGS  
(CAYMAN), LTD.,

Defendant.

**VERIFICATION**

I certify that the answers set forth in Defendant Imperium IP Holdings (Cayman), Ltd.'s Answers and Objections to First Set of Requests for Admission are true and correct to the best of my knowledge, information, and belief. I further certify that I am authorized to execute this Verification on behalf of Imperium IP Holdings (Cayman), Ltd.

Dated: February 1, 2021

  
Vincent S. Capone  
General Counsel



# **EXHIBIT 5**

**IN THE UNITED STATES DISTRICT COURT  
FOR THE EASTERN DISTRICT OF TEXAS  
SHERMAN DIVISION**

**IMPERIUM IP HOLDINGS  
(CAYMAN), LTD.,**

**Plaintiff,**

**v.**

**SAMSUNG ELECTRONICS CO., LTD.,  
SAMSUNG ELECTRONICS  
AMERICA, INC., SAMSUNG  
TELECOMMUNICATIONS AMERICA,  
LLC, SAMSUNG SEMICONDUCTOR, INC.,  
SAMSUNG TECHWIN CO., LTD., AND  
SAMSUNG OPTO-ELECTRONICS  
AMERICA, INC. (D/B/A SAMSUNG  
TECHWIN AMERICA),**

**Defendants.**

**Case No. \_\_\_\_\_**

**JURY TRIAL DEMANDED**

**COMPLAINT FOR PATENT INFRINGEMENT**

Plaintiff Imperium IP Holdings (Cayman), Ltd. (“Imperium”) files this Complaint for Patent Infringement against Defendants Samsung Electronics Co., Ltd., Samsung Electronics America, Inc., Samsung Telecommunications America, LLC, Samsung Semiconductor, Inc., Samsung Techwin Co., Ltd., and Samsung Opto-Electronics America, Inc. (d/b/a Samsung Techwin America) (collectively, “Defendants”) and asserts as follows:

**THE PARTIES**

1. Imperium is an intellectual property company that holds more than 70 patents on core technologies relating to image sensors and other features used in consumer electronic products such as cell phones, digital cameras, tablet computers, and laptops. Years ago, at the request of the United States Government, a team of engineers at Imperium’s predecessor-in-interest developed image sensor technologies for use in military applications, and

40. Imperium has been damaged, and continues to be damaged, by Defendants' infringement of the '290 Patent.

**COUNT THREE**  
**INFRINGEMENT OF U.S. PATENT NO. 7,092,029**

41. Imperium re-alleges and incorporates by reference paragraphs 1-17 above.

42. On August 15, 2006, the U.S. Patent and Trademark Office duly and legally issued United States Patent No. 7,092,029 (the "'029 Patent"), entitled "Strobe Lighting System for Digital Images." Imperium is the owner of the '029 Patent, a true and correct copy of which is attached as Exhibit C to this Complaint.

43. The '029 Patent relates to inventive systems and methods for determining the amount of supplemental flash lighting needed to properly expose a photographic subject (as used, for example, in digital cameras, cell phones, etc.). The '029 Patent has claims directed to, *inter alia*, a method of adjusting image lighting, the method comprising: generating a preparatory light for a predetermined preparatory duration; capturing a preparatory image while generating the preparatory light, wherein the preparatory image is represented by preparatory image data; determining an average preparatory image luminance of the preparatory image based on the preparatory image data and weighting at least a subset of the preparatory image data; generating a supplemental strobe duration based on the average preparatory image luminance and luminance weightings; and generating a look-up table storing associated image strobe durations and power values including a preparatory image strobe duration and associated preparatory power value.

44. Defendants have infringed and continue to infringe one or more claims of the '029 Patent, in violation of 35 U.S.C. § 271, by manufacturing, using, selling, offering for sale, and/or importing cell phones, digital cameras, tablet computers including, but not limited to, the following (collectively referred to as the "'029 Accused Devices"): *cell phones* such as the

Intensity II (SCH-U460) and the Galaxy S2 and S3; *tablet computers* such as the Galaxy Tab 7.0 and Tab 7.7 tablets, the Galaxy Tab 10.1 (GT-P7510) and Galaxy Tab 2 10.1 (GT-P51XX); *digital cameras* such as the Digimax S500 and S600, the DV150F, the DV300F, the EX2F, the Galaxy Camera, Galaxy Camera 2, and Galaxy NX Camera, the MV900 and MV900F digital cameras, the NV3, NV4, NV11, NV15, and NV40 digital cameras, the NX-5, NX-20, NX-30, NX-300, NX-1000, and NX-2000 digital cameras, the PL20, PL21, PL90, PL120, and PL121 digital cameras, the S85, S630, S730, S750, S760, S850, and S860 digital cameras, the ST72, ST150F, and ST151F digital cameras, the WB30F, the WB100, the WB150 and WB150F digital cameras, the WB200F, WB250, WB350, WB350F, WB800F, WB850, and WB2100 digital cameras; and any such reasonably similar products.

45. By way of example, the '029 Accused Devices include a processor electrically connected to a strobe, and **an image sensor coupled to a memory**, where a supplemental strobe duration stored in the memory is generated from **a preparatory image received at the processor from the image sensor when the strobe is activated to generate a preparatory light for a preparatory duration**. The processor of the '029 Accused Devices accesses a look-up table in the memory that stores image strobe durations and power values including a preparatory image strobe duration and an associated preparatory power value.

46. Defendants also indirectly infringe the '029 Patent by inducing infringement by others, such as manufacturers, resellers, and/or end-users of the '029 Accused Devices, of one or more claims of the '029 Patent in violation of 35 U.S.C. § 271. On information and belief, Defendants knew of the '029 Patent and knew of its infringement, including by way of this lawsuit and earlier. For example, Defendants knew of the '029 Patent at least as early as March 2013, when the U.S. Patent and Trademark Office identified the '029 Patent for Defendant SEC in an Office Action during prosecution of a Samsung patent application (U.S. Patent Application No. 12/731,244).

47. Defendants' affirmative acts of selling the '029 Accused Devices, causing the '029 Accused Devices to be manufactured and distributed, and providing instruction manuals for the '029 Accused Devices have induced and continue to induce Defendants' manufacturers, resellers, and/or end-users to make or use the '029 Accused Devices in their normal and customary way to infringe the '029 Patent. Defendants have specifically intended and were aware that these normal and customary activities would infringe the '029 Patent. Defendants performed the acts that constitute induced infringement, and would induce actual infringement, with the knowledge of the '029 Patent and with the knowledge, or willful blindness to the probability, that the induced acts would constitute infringement.

48. Defendants further indirectly infringe the '029 Patent by manufacturing, using, selling, offering for sale, and/or importing the '029 Accused Devices to resellers and/or end-users with knowledge that the '029 Accused Devices were and are especially manufactured and/or especially adapted for use in an infringement of the '029 Patent, and are not a staple article or commodity of commerce suitable for substantial non-infringing use.

49. The '029 Patent recites the invention of a circuit with the function of adjusting image lighting. Each of the '029 Accused Devices contains a processor and/or image sensor with a circuit that performs this function in the manner claimed in the '029 Patent. This circuit is integrated into the processor and/or image sensor, which is mounted directly onto a circuit board for use in the device. On information and belief, individual portions of the processor and/or image sensor are not designed to operate in isolation; they are designed to operate in unison. Accordingly, without this circuit or its function, the processor and/or image sensor would either not function or function in an unintended manner. From this, the most compelling inference that arises is the processor and/or image sensor has no substantial non-infringing uses, and that any other uses would be unusual, far-fetched, illusory, impractical, occasional, aberrant, or experimental. Defendants' manufacture, use, sale, offering for sale, and/or importation of the '029 Accused Devices to resellers and/or end-users constitutes contributory infringement of the '029 Patent.

50. On information and belief, including the allegations above showing knowledge and intent, Defendants' infringement has been and continues to be deliberate, willful, and in reckless disregard of Imperium's patent rights.

51. Imperium has been damaged and continues to be damaged by Defendants' infringement of the '029 Patent.

#### **PRAYER FOR RELIEF**

WHEREFORE, Plaintiff Imperium demands judgment against Defendants, including their affiliates, officers, agents, servants, employees, and all persons in active concert or participation with them, as follows:

A. An award to Plaintiff Imperium of such damages under 35 U.S.C. § 284 as proven against Defendants for infringement of the '884 Patent, '290 Patent, and '029 Patent, together with pre-judgment and post-judgment interest;

B. A permanent injunction prohibiting Defendants from further acts of infringement of the '884 Patent, '290 Patent, and '029 Patent;

C. A declaration that Defendants have willfully infringed the '884 Patent, '290 Patent, and '029 Patent;

D. An increase in the award of damages to Plaintiff Imperium up to three times the amount of its actual damages for Defendant's willful infringement, as authorized by 35 U.S.C. § 284;

E. An award to Plaintiff Imperium of the costs of this action and its reasonable attorneys' fees pursuant to 35 U.S.C. § 285; and

F. Such other and further relief as this Court may deem just and appropriate.

**JURY DEMAND**

Pursuant to Rule 38(b) of the Federal Rules of Civil Procedure, Plaintiff Imperium demands a trial by jury.

Date: June 9, 2014

Respectfully submitted,

/s/ Alan M. Fisch

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*Attorney for Plaintiff Imperium IP Holdings  
(Cayman), Ltd.*

# EXHIBIT 6



US007092029B1

(12) **United States Patent**  
**Medwick et al.**(10) **Patent No.:** **US 7,092,029 B1**(45) **Date of Patent:** **Aug. 15, 2006**(54) **STROBE LIGHTING SYSTEM FOR DIGITAL IMAGES**(75) Inventors: **Robert A. Medwick**, Aptos, CA (US);  
**Glenn Stark**, Santa Cruz, CA (US)(73) Assignee: **ESS Technology, Inc.**, Fremont, CA (US)

(\*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 430 days.

(21) Appl. No.: **09/816,038**(22) Filed: **Mar. 22, 2001****Related U.S. Application Data**

(60) Provisional application No. 60/192,008, filed on Mar. 24, 2000.

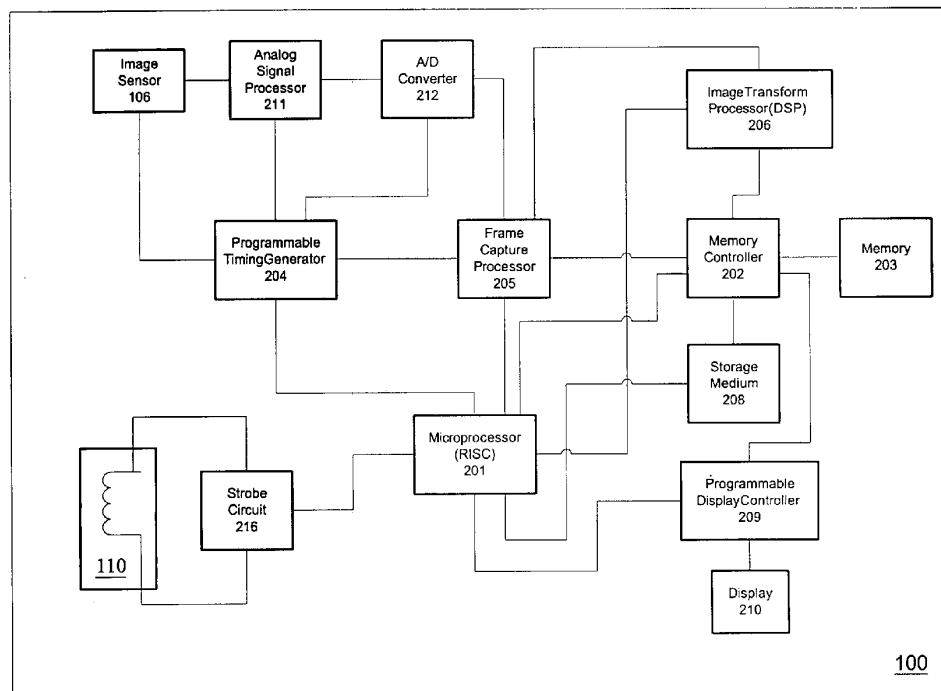
(51) **Int. Cl.**  
**H04N 5/222** (2006.01)  
**H04N 5/235** (2006.01)(52) **U.S. Cl.** ..... **348/371; 348/370; 348/229.1**(58) **Field of Classification Search** ..... **348/370, 348/371, 229.1, 300; 396/61, 157, 155**  
See application file for complete search history.(56) **References Cited****U.S. PATENT DOCUMENTS**

4,954,897 A \* 9/1990 Ejima et al. .... 348/229.1

\* cited by examiner

*Primary Examiner*—David Ometz*Assistant Examiner*—Kelly Jerabek(74) *Attorney, Agent, or Firm*—Farjani & Farjani LLP(57) **ABSTRACT**

An image sensor acquires a preparatory image that is lighted for a predetermined preparatory duration by a strobe. The preparatory image data corresponding to the preparatory image from the image sensor is processed and an average preparatory image luminance is determined based on the preparatory image data and weighting at least a subset of the preparatory image data. A supplemental strobe duration is generated based on the average preparatory image luminance and luminance weightings. The electronic image sensor may be activated to acquire an image with supplemental light provided by the supplemental strobe duration.

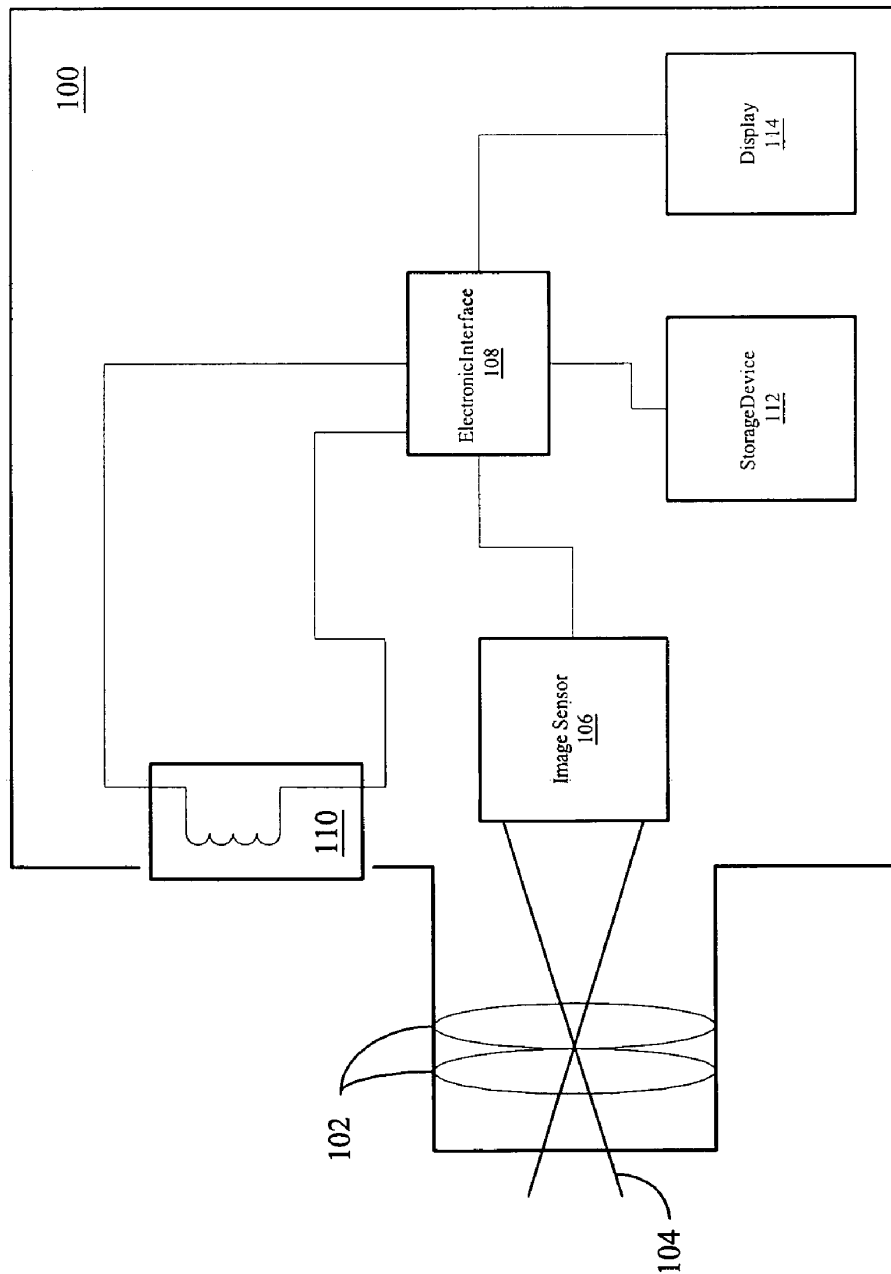
**28 Claims, 10 Drawing Sheets**

**U.S. Patent**

**Aug. 15, 2006**

**Sheet 1 of 10**

**US 7,092,029 B1**



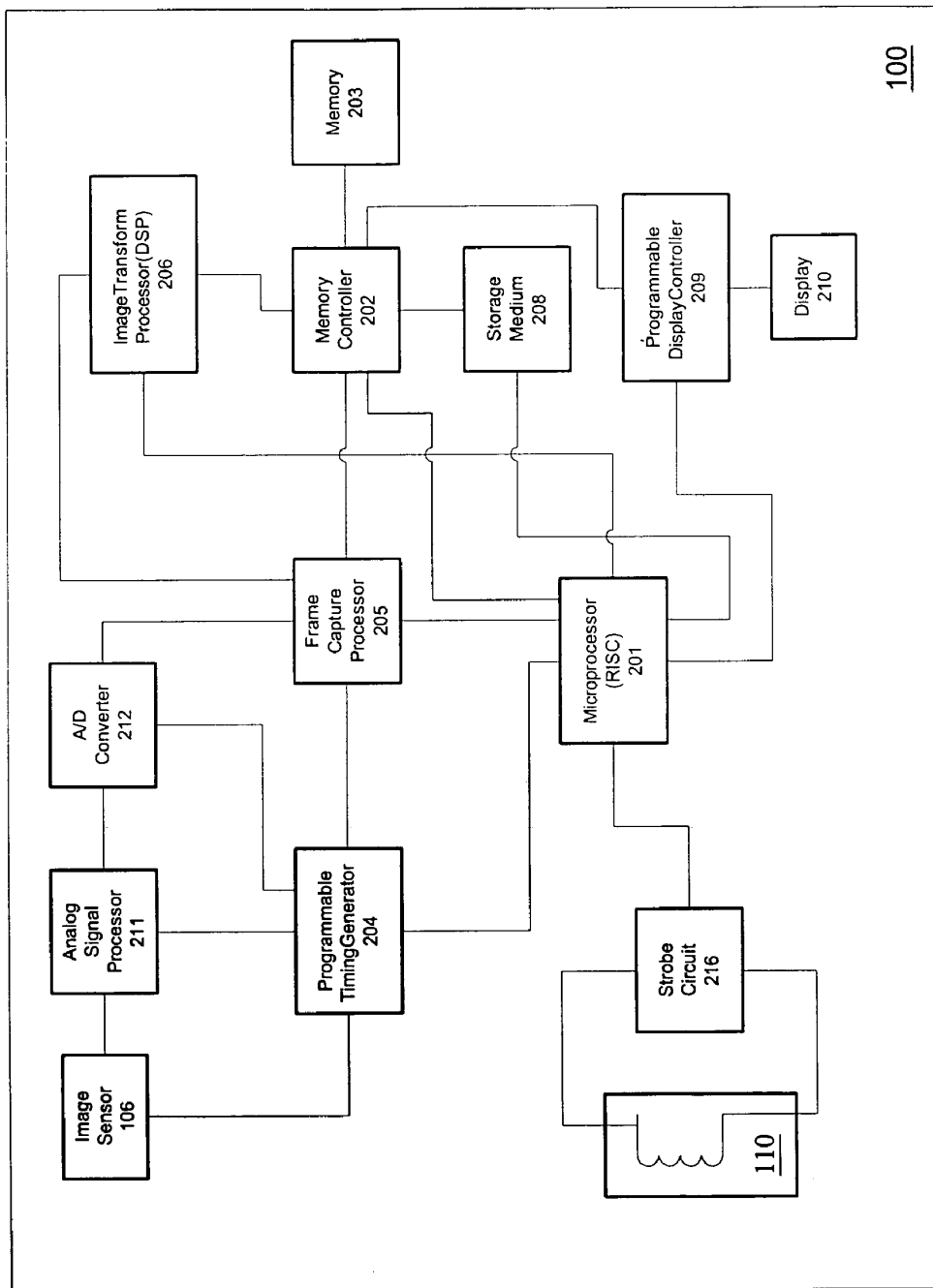
**FIG.1**

**U.S. Patent**

**Aug. 15, 2006**

**Sheet 2 of 10**

**US 7,092,029 B1**



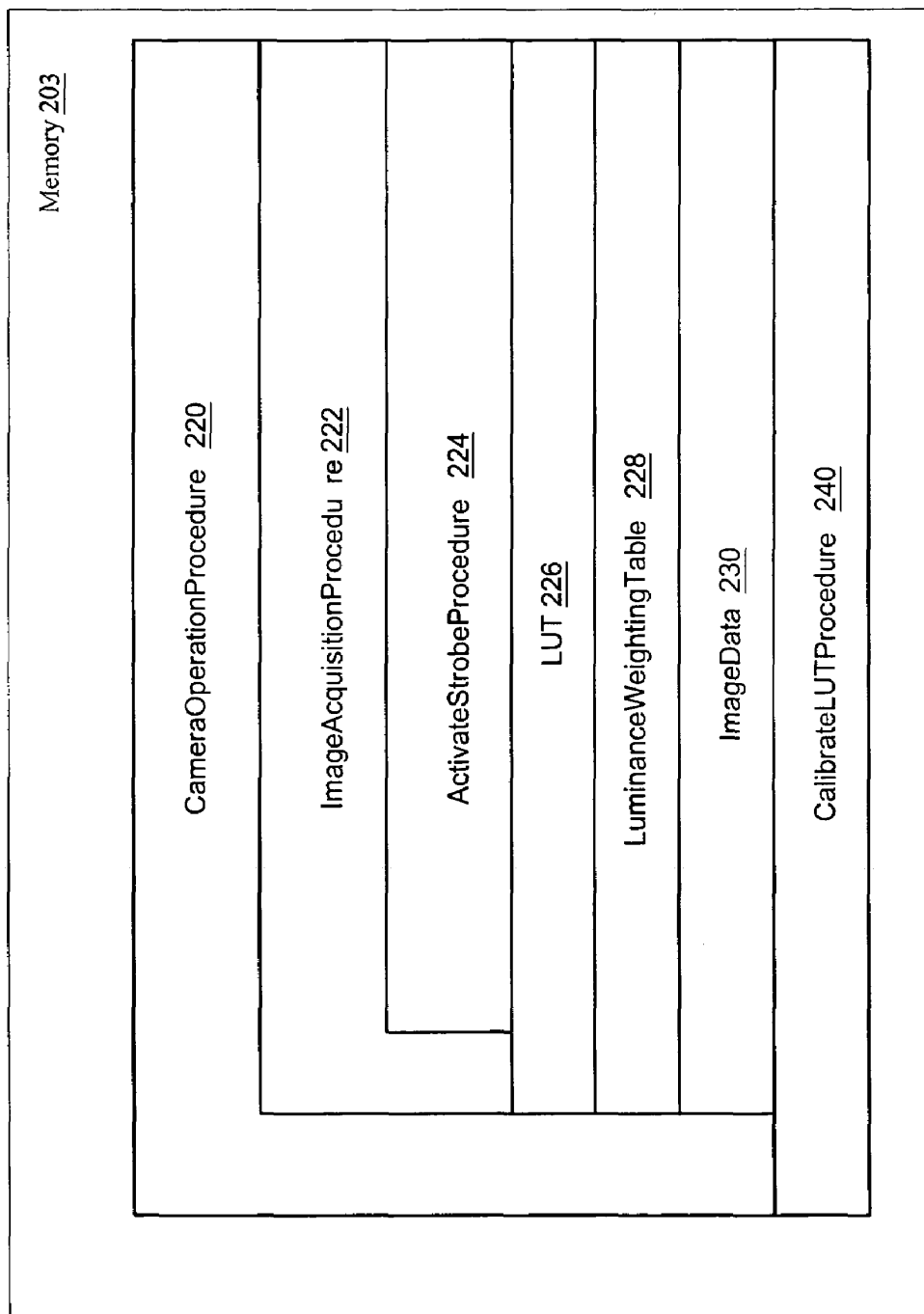
**FIG.2**

**U.S. Patent**

Aug. 15, 2006

Sheet 3 of 10

**US 7,092,029 B1**



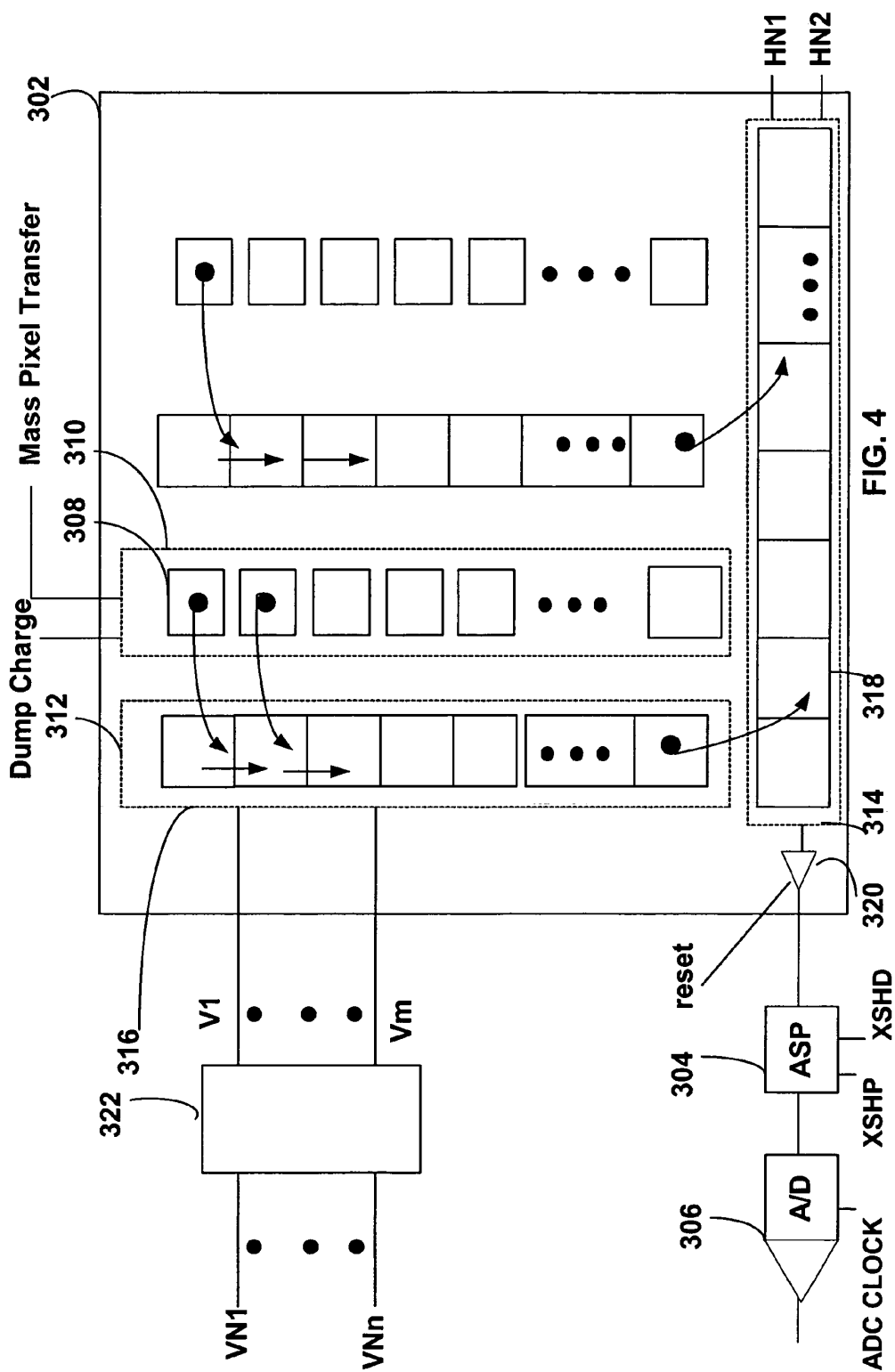
**FIG. 3**

U.S. Patent

Aug. 15, 2006

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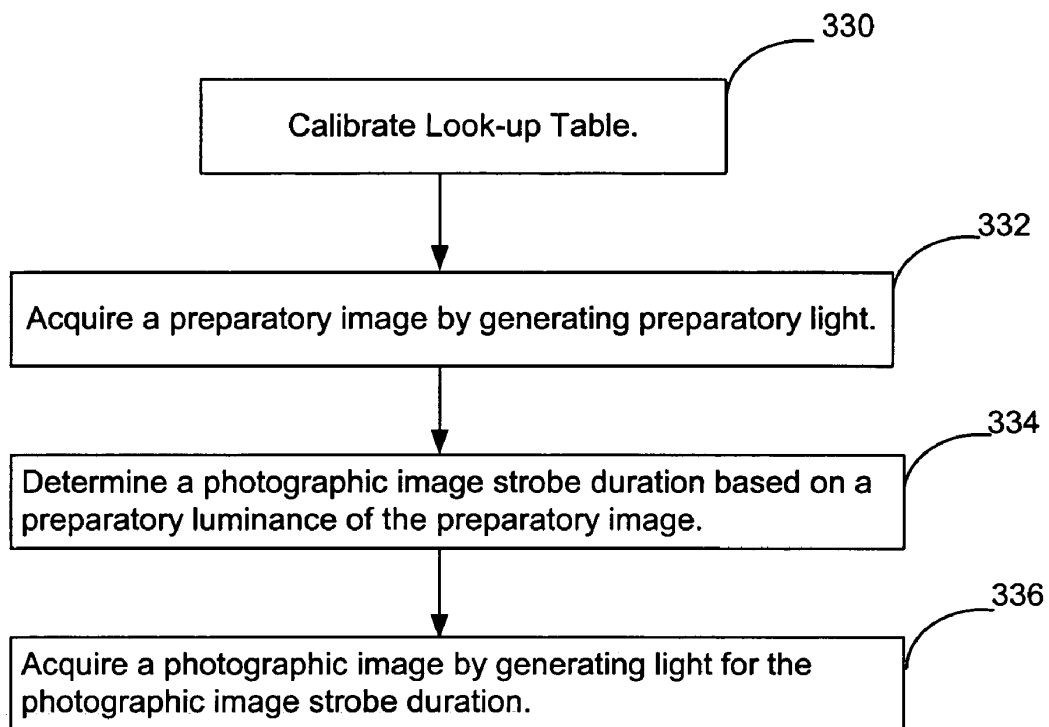


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**FIG. 5**

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226

342

50 us	1000
25 us	349
50 us	981
75 us	1453
100 us	2075
400 us	4217
800 us	5387

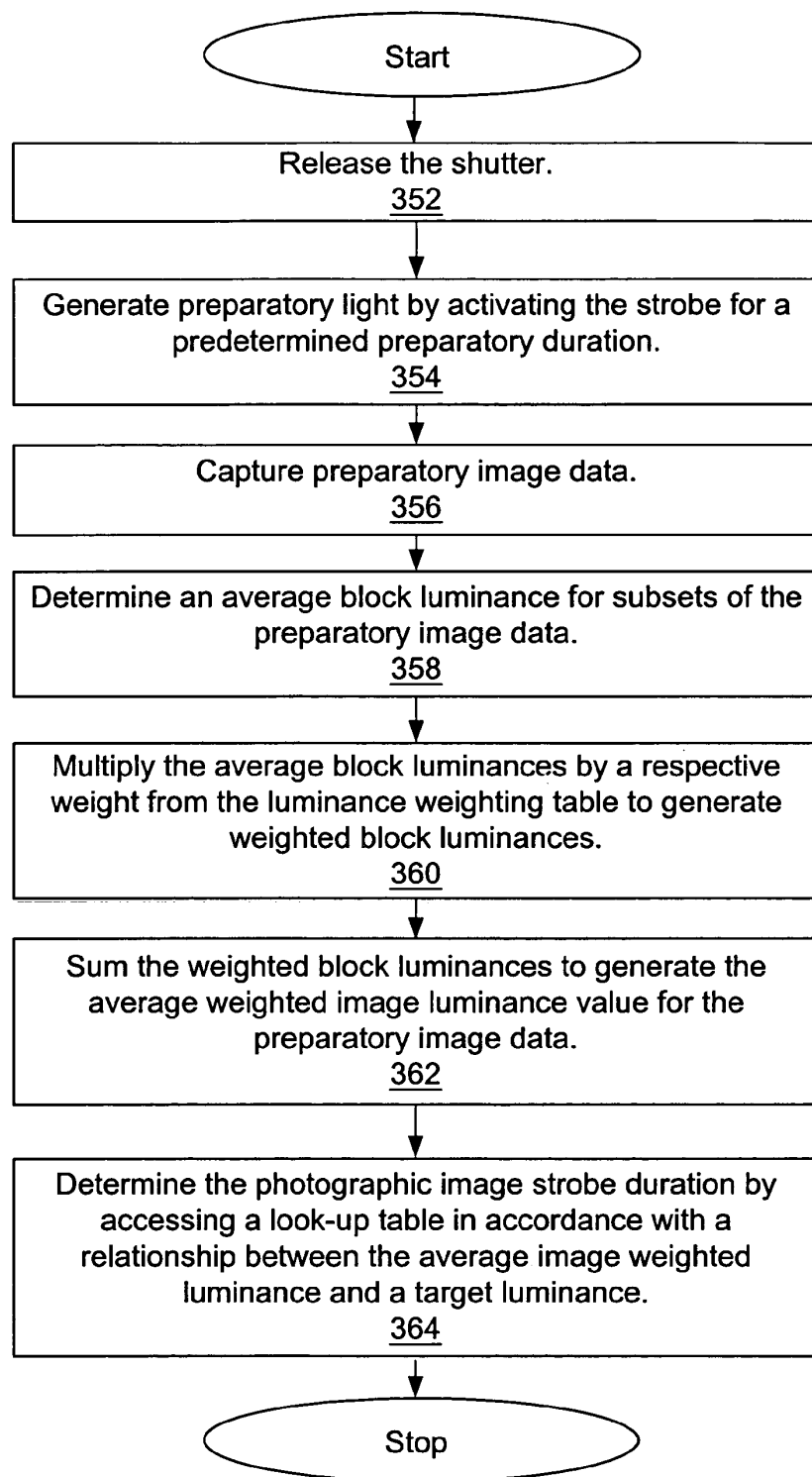
344

Look-up Table  
**FIG. 6**

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**US 7,092,029 B1****FIG. 7**

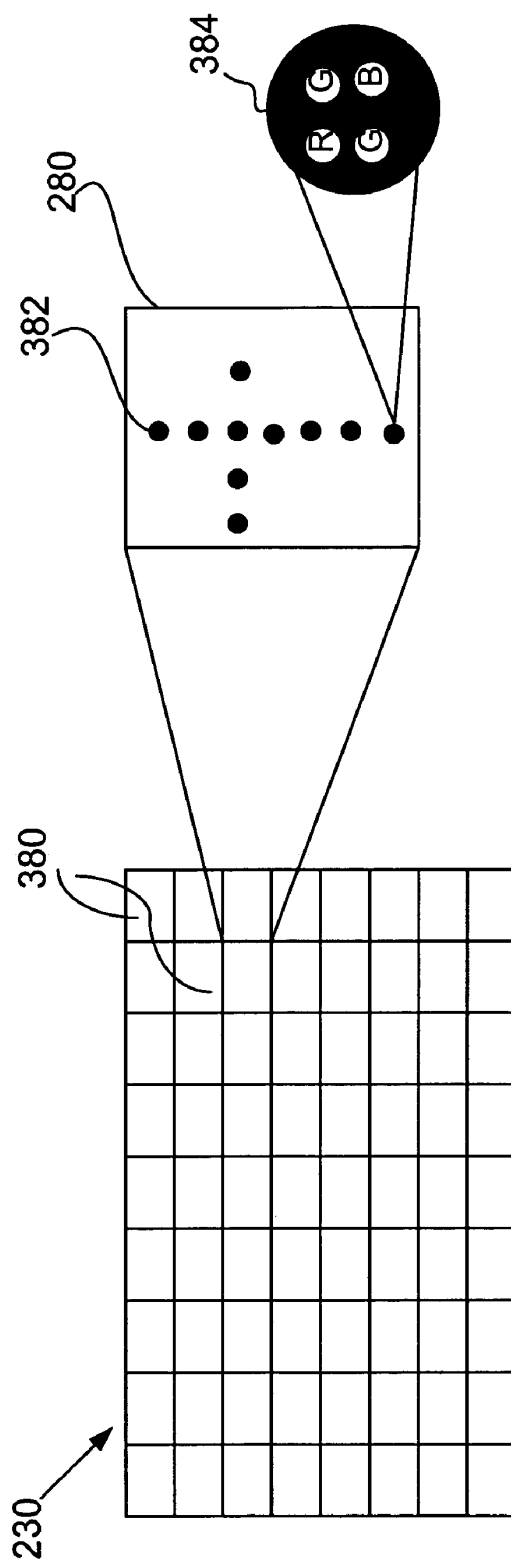


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Blocks of Image Data

**FIG. 8**

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228

380

386

0	0	0	0	0	0	0	0
0	1	1	1	1	1	1	0
0	1	2	4	4	2	1	0
0	1	4	8	8	4	1	0
0	1	4	8	8	4	1	0
0	1	2	4	4	2	1	0
0	1	2	2	2	2	1	0
0	1	2	2	2	2	1	0

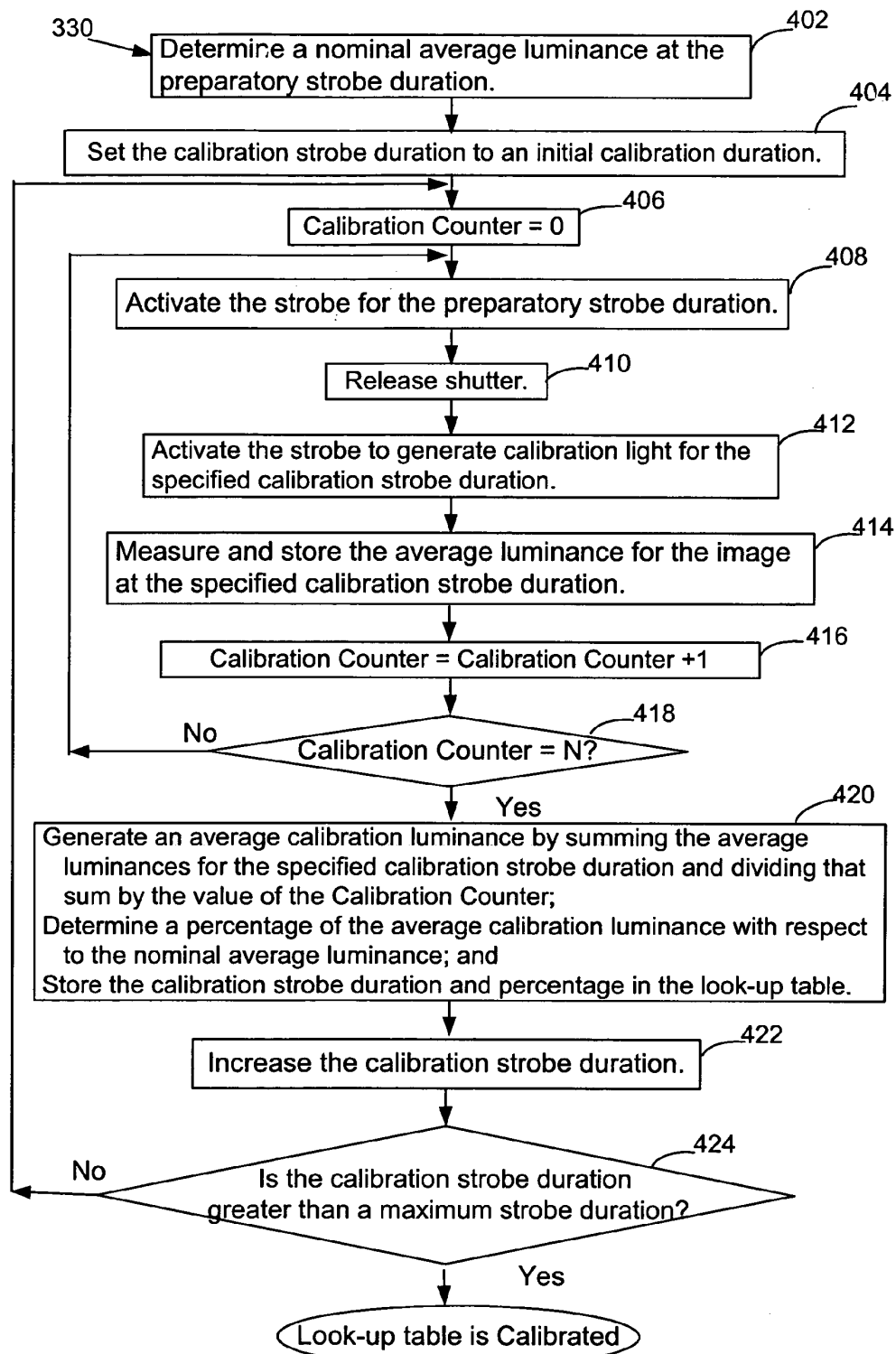
**Luminance Weighting Table**  
**FIG. 9**

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Calibrating the Look-up Table  
FIG. 10

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**STROBE LIGHTING SYSTEM FOR DIGITAL IMAGES****CROSS-REFERENCE TO RELATED APPLICATIONS**

This application claims the benefit of Provisional Patent Application Ser. No. 60/192,008, filed on Mar. 24, 2000, and entitled STROBE FOR A DIGITAL CAMERA.

**BACKGROUND OF THE INVENTION****1. Technical Field**

This invention relates generally to a strobe lighting system used in the capturing of for digital images.

**2. Related Art**

Digital cameras for capturing digital images are commercially available and allow individuals to create digital images, rather than images on film as with traditional cameras. In a digital camera, an image sensor measures reflected light from an object that is processed into a digital image.

Typically, digital cameras and other imaging products utilize image sensors (also known as electronic image sensors) that are solid-state devices. Examples of image sensors include charge-coupled device (CCD), charge injection devices (CID) and complementary metal oxide semiconductor (CMOS) imagers. The image sensors typically have a number of cells or pixels arranged along vertical and horizontal dimensions commonly referred to as a matrix (also known as a pixel array). Image sensors typically utilize off-chip signal processing to improve signal to noise (S/N) performance and compensate for reset noise. Image sensors may be found in various pixel array configurations, including SIF or QVGA 320×240, CIF 352×288, VGA 640×480, SVGA 800×600, XGA 1024×768, SxGA 1280×1024, 2 Mega pixel, 3 Mega pixel and 16 Mega pixels.

Image information sensed by each pixel of an image sensor is converted into a digital signal. The digital signal is created from the image information stored in the pixels of the pixel array and is output serial using an arrangement of shift registers (in the case of CCD) or via a row and column selection (in the case of CMOS imager). After the image information is converted into a digital signal referred to as image data, the image data is stored in a memory. The image data may be post processed by a digital signal processor (DSP) to improve the quality of the digital image.

An image sensor capable of capturing color images increase the complexity of processing the digital image data. In one approach, the image sensor has a geometric arrangement of cells forming a pixel responding to three primary colors, eg., red, green and blue. Since each cell senses a particular color, various algorithms are used to interpolate the missing color information. Alternately, two or more image sensors having different color sensitivity may be utilized and the image data combined by a signal processor.

When taking photographs with a traditional film camera, it is often desirable to have additional lighting to illuminate a subject. A "flash" is often utilized with a camera to provided illumination of the subject. Consequentially, problems exist when too much light or not enough light is reflected from the subject (also known as a object) onto the film. The problems of under exposure and over exposure result when too much light or too little light reach the film. Similar lighting problems exist with digital photography using an image sensor in place of film.

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An image sensor utilized to capture an image has the same problems with subject lighting as traditional film cameras. A supplemental lighting source, such as a strobe, may be utilized with digital camera having an image sensor. The duration of the supplemental light is determined based on an average value of a preparatory image data. However, the amount of light generated does not correspond to a particular area of interest in the image. For example, in a portrait, the subject is typically placed in an area of interest in the center of the image; however, the supplemental light is generated based on the entire image, including the background. The light from the background behind the subject affects the calculation of the supplemental light in the same manner as the subject, and as such reduces the visual quality of the image. Therefore a system is needed to generate supplemental light that accords more weight to an area of interest of the image.

**SUMMARY**

Broadly conceptualized, the invention is an approach to determine an average preparatory image luminance based on the preparatory image data and weighting at least a subset of the preparatory image data. Thus, the electronic image sensor is activated to acquire a photographic image. Supplemental light is provided in accordance with a supplemental strobe duration. Photographic image data corresponding to the photographic image from the electronic image sensor is captured. The duration of the supplemental strobe is adjusted based on the weighting of the luminance of the preparatory image, resulting in an increase in the visual quality of the exposed digital image.

Other systems, methods, features and advantages of the invention will be or will become apparent to one with skill in the art upon examination of the following figures and detailed description. It is intended that all such additional systems, methods, features and advantages be included within this description, be within the scope of the invention, and be protected by the accompanying claims.

**BRIEF DESCRIPTION OF THE FIGURES**

The components in the figures are not necessarily to scale, emphasis instead being placed upon illustrating the principles of the invention. In the figures, like reference numerals designate corresponding parts throughout the different views.

FIG. 1 is a block diagram of a digital camera having an electronic image sensor and supplemental light.

FIG. 2 is a block diagram of the digital camera of FIG. 1.

FIG. 3 is a block diagram showing at least a portion of procedures and data stored in a memory block of FIG. 2.

FIG. 4 is a block diagram of an exemplary electronic image sensor suitable for use in the digital camera of FIG. 1.

FIG. 5 is a flowchart showing the calibration of the electronic image sensor of FIG. 4.

FIG. 6 is a look-up table stored in the memory of FIG. 2, as identified in FIG. 3.

FIG. 7 is a flowchart of an activate strobe procedure of FIG. 3 and FIG. 5.

FIG. 8 is an exemplary image data that is divided into blocks with a selected subset of spots having pixels that are arranged in a Bayer-pattern.

FIG. 9 is an exemplary luminance weighting table of FIG. 3.

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FIG. 10 is a flowchart of a calibrate look-up table procedure of FIG. 3 and FIG. 5.

#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The following patent applications are incorporated by reference to assist in the description of certain elements and features of this invention. They are described in greater detail later in the specification, but include:

U.S. patent application, titled "Programmable Image Transform Processor for a Digital Camera," Ser. No. 09/188,871, filed Nov. 9, 1998;

U.S. patent application, titled "Programmable Timing Generator for a Digital Camera," Ser. No. 09/188,831, filed Nov. 9, 1998;

U.S. patent application, titled "Programmable Display Controller for a Digital Camera," Ser. No. 09/188,996, filed Nov. 9, 1998.

In FIG. 1, a block diagram of a digital camera 100 having an electronic image sensor and supplemental light is shown. A lens 102 transmits the image-forming light 104 onto an electronic image sensor (image sensor) 106. The image sensor 106 is built into the digital camera 100 and is located at the focal plane of the lens 102. The image sensor 106 is typically a charge-coupled device (CCD), charge injection device (CID) or a complementary metal-oxide-semiconductor (CMOS) sensor.

Image sensors differ in the arrangement of the cells within the image sensor and the type of charge readout. The image sensor 106 connects to an electronic interface circuitry 108. The electronic interface circuitry 108 also connects to a strobe 110, a storage device 112 and a display 114. The electronic interface circuitry 108 controls the amount of time that the strobe 110 is activated to generate supplemental light. The electronic interface circuitry 108 controls the storage device 112 and enables sensed images by the image sensor 106 to be stored. The storage device 112 may include a tape drive, a disk drive, such as a floppy disk drive, hard disk drive, optical disk drive, or magneto-optical disk drive, or an integrated circuit card with RAM or electrically erasable programmable read only memory (EEPROM). The storage device 112 may be inside the digital camera 100 or attached to the digital camera 100 externally. The electronic interface circuitry 108 can also control the display 114 to display the image sensed by the image sensor 106. The display 114 may be inside the digital camera 100 or attached to the digital camera 100 externally. The display 114 is optional and the digital camera 100 may function without the display 114. The electronic interface circuitry 108 may operate the display 114 in a viewfinder mode or a review, (i.e., stored image viewing) mode, if the display 114 is present.

FIG. 2 is a block diagram of the digital camera 100 of FIG. 1. A microprocessor (RISC) 201 is coupled to a memory controller 202, a programmable timing generator 204, a frame capture processor 205, a programmable image transform processor 206, a storage medium 208 and a display controller 209. The memory controller 202 is connected to a memory 203. The display controller 209 is coupled to a display 210. The image sensor 106 is coupled to an analog signal processor (ASP) 211 that connects to the analog-to-digital converter (A/D converter) 212. The timing generator 204 is coupled to the image sensor 106, ASP 211 and A/D converter 212, the frame capture processor 205, and the microprocessor 201. The programmable image transform processor 206, commonly called a digital signal pro-

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cessor (DSP), and other elements read data from the write data to the memory 203 via the memory controller 202. Preferably, the memory 203 includes a high-speed DRAM to store the digital image data. The A/D converter 212 supplies digital image data to the image transform processor 206. The image transform processor 206 stores the digital image data in the memory 203. The timing generator 204 supplies timing signals to the DSP 206 and A/D converter 212 to synchronize the transfer of digital image data between the A/D converter 212 and the frame capture processor 205. The frame capture processor 205 supplies the digital image data to the DSP 206. Alternately, the frame capture processor 205 stores the digital image data from the sensor directly into the memory 203, and the DSP 206 fetches the data from the memory for further processing. The frame capture processor 205 supports real-time windowing, histogram, gamma correction, white balance, and auto-focus functions. A strobe circuit 216 interfaces the strobe 110 with the microprocessor 202.

FIG. 3 is a block diagram showing at least a portion of procedures and data stored in a memory block of 203 of FIG. 2. The memory 203 stores procedures and digital image data as follows:

A camera operation procedure 220 for controlling the overall operation of the digital camera 100.

An image acquisition procedure 222 that acquires image data representing an image.

An activate strobe procedure 224 that operates the strobe 110, FIG. 2, when the image acquisition procedure 222 determines that supplemental light is needed. The image acquisition procedure 222 invokes the activate strobe procedure 224.

A look-up table (LUT) 226 that is accessed by the activate strobe procedure 224 to determine a duration for activating the strobe 110, FIG. 2, when acquiring an image; preferably, the LUT 226 is stored in non-volatile memory such as an EEPROM.

A luminance weighting table 228 that is accessed by the activate strobe procedure 224 to determine the amount of weight given to portions of preliminary image data. Image data 230 that includes preliminary image data; the image data 230 is a digital representation of the image sensed by the image sensor 106, FIG. 1.

A calibrate LUT procedure 240 that populates the LUT 226; the calibrate LUT procedure 240 is loaded into the memory 203 from a storage medium 208, FIG. 2, such as a floppy disk, during the manufacturing process; once the LUT 226 is populated, the calibrate LUT procedure 240 is no longer stored in the memory 203.

Referring to both FIG. 2 and FIG. 3, the microprocessor (RISC) 201 executes the camera operation procedure 220, which is stored in memory 203. Alternately the camera operation procedure 220 may be stored in a ROM, or loaded into the memory 203 from the storage medium 208. The digital camera 100 operation procedure 220 includes the image acquisition procedure 222. When a user presses a store-image button (not shown), the camera operation procedure 220 causes the image sensor 106 to acquire an image. The image acquisition procedure 222 causes the microprocessor 201 to control the programmable timing generator 204 to generate vertical and horizontal clock signals for use the image sensor 106. The image sensor 106 outputs image data comprising a series of analog signals corresponding to the color and intensity of the image sensed by each cell of the image sensor 106. The image data is then sent to the ASP 211 and to the A/D converter 212.

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The ASP 211 processes the image data before input to the A/D converter 212. For example, the ASP has a programmable amplifier with adjustable gain, and also reduces or eliminates noise, such as reset noise, from the image data using methods well known to those in the art, such as correlation-double-sampling. The A/D converter 212 then converts the analog image data into digital image data. In an alternate embodiment, the ASP 211 is not utilized.

The digital image data is stored in memory 203. Execution of the camera operation procedure 220 by the microprocessor 201 causes the digital image data to be processed by the programmable image transform processor 206. The processed digital image data is compressed and recorded in memory 203, on a storage medium 208 or transferred to display controller 209 for output to a display 210.

To control the operation of the strobe 110, the microprocessor 202 connects to a strobe circuit 216. The strobe circuit 216 includes a high voltage power supply that supplies power to activate the strobe 110 in response to a signal from the microprocessor 201. The image acquisition procedure 222 sends signals to the strobe circuit 216 causing the strobe 110 to generate supplemental light.

U.S. patent application, titled "Programmable Image Transform Processor for a Digital Camera," Ser. No. 09/188,871, filed Nov. 9, 1998, is incorporated by reference as information explaining the operation of the image transform processor 206. U.S. patent application, titled "Programmable Timing Generator for a Digital Camera," Ser. No. 09/188,831, filed Nov. 9, 1998, is also incorporated by reference as information explaining the operation of the timing generator 204. U.S. patent application, titled "Programmable Display Controller for a Digital Camera," Ser. No. 09/188,996, filed Nov. 9, 1998, is also incorporated by reference as information explaining the operation of the display controller 209.

In FIG. 4, a diagram of an exemplary electronic image sensor suitable for use in the digital camera 100 of FIG. 1 is shown. The image sensor 302 may be a CCD, CID or CMOS device. In the example implementation of a CCD, the image sensor 302 connects to the ASP 304 and the A/D converter 306. The image sensor 302 has cells 308, vertical shift registers 312 and a horizontal shift register 314. Each cell 308 absorbs light and converts the light energy into an electrical charge. The amount of charge is a measure of light energy absorbed. The size of the image sensor determines the quality of the image. The quality of the image improves as the number of cells increases. Image sensors are available in many sizes, such as SIF or QVGA 320×240, CIF 352×288, VGA 640×480, SVGA 800×600, XGA 1024×768, SxGA 1280×1024, 2 Mega pixel, 3 Mega pixel and 16 Mega pixels.

The components of the image sensor 302 are arranged along horizontal and vertical dimensions. An array 310 of cells 308 is arranged in the vertical dimension. The vertical shift register 312 has elements 316 for storing the charge sensed by the cells 308. Each cell 308 in the array of cells 310 connects to a corresponding element 316 in the vertical shift register 312.

Free charge moves from regions of higher potential to regions of lower potential. By alternating the voltages on the electrodes (not shown) connected to the cells 308 and the elements 316 and 318 of the shift registers 312 and 314 in proper phase, a charge packet, i.e., the charge from the cell 308, can be moved from the cell 308 to an element 316 of the shift register 312 and then moved from one element to another element in the shift registers and finally to the image sensor 302 output.

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Thus, when appropriate voltages are applied to the cell 308 and the corresponding element 316 in the vertical shift register 312, the charge generated in the cell 308 is transferred out of the cell 308 to the corresponding element 316 in the vertical shift register 312. The programmable timing generator is programmed to generate timing or clock signals that cause the transfer of the charge to occur at the appropriate time. When appropriate voltages are applied to adjacent elements of the vertical shift register 312, the charge is transferred from one element to another. The last element or output of each vertical shift register 312 connects to a corresponding element 318 in the horizontal shift register 314. When appropriate voltages are applied to the last element of the vertical shift register 312 and the corresponding element 318 of the horizontal shift register 314, the charge is transferred from the vertical shift register 312 to the horizontal shift register 314. When appropriate voltages are applied to adjacent elements of the horizontal shift register 314, the charge is transferred from one element to another and finally output. The output of the horizontal shift register 314 connects to the ASP 304 via an output amplifier 320.

The cells of the image sensor acquire an image or charge when exposed to light. Therefore, the image sensor has a port for receiving an OverflowDrain pulse, or DumpCharge signal to reset the cells of the image sensor. The DumpCharge signal is pulsed one or more times prior to the start of exposure. The exposure time begins after the last DumpCharge pulse and ends when either a mechanical shutter is closed, or if an electronic shutter is used, when the accumulated charge in the cells is transferred to the vertical shift registers. A mass pixel transfer signal causes the image sensor to transfer the charge in its cells to the vertical shift registers to capture an image.

Various signals are utilized to control the image sensor and to synchronize its operation with other system components. An amplifier reset signal connects to the output amplifier 320. XSHP and XSHD signals control the ASP 304 and an ADC clock signal connects to the A/D converter 306. Horizontal clock signals H 1 and H 2 control the horizontal shift register 314. Vertical clock signals V 1 to V n connect to a vertical clock driver 322 that generates signals V1 to Vm to control the vertical shift registers. In one embodiment, signals V 1 to V n are binary signals, while signals V1 to Vm are binary signals having three states.

Color imaging is more complex. In one method, the image sensor 302 has a geometric arrangement of cells to respond to three colors, e.g., red, green and blue. Alternately, two or more image sensors having different color sensitivity are used. In another embodiment, the image sensor 302 includes a color filter that causes either red, green or blue light to pass to the pixels on the image sensor in a predefined pattern, such as a Bayer pattern. Each pixel receives a single color, and the output from the image sensor includes a red, a green and a blue color channel.

It is appreciated by those of skill in the art that while a CCD has been described, the image sensor 106 may equally be implemented in a CID or CMOS imager. In the case of a CMOS imager, the image sensor may contain a photodiode, row-select transistor and a reset transistor per pixel in the pixel array. By activating a row, the data from the pixels in that row simultaneously copied into the columns. Each column will have a load transistor, column select switch, and a sampling switch. In this example the CMOS imager does not rely upon charge transfer such as the CCD. Unlike CCDs, the CMOS imager may be fully addressable and the pixels in the pixel array may be read out at high frame rates.



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FIG. 5 is a flowchart showing the calibration of the electronic image sensor of FIG. 4. In step 330, the calibrate look-up table procedure 240 populates the look-up table 226. Steps 332–334 are implemented by the activate strobe procedure 224 of FIG. 4. In step 332 the activate strobe procedure 224 acquires a preparatory image while generating preparatory light. To generate the preparatory light, the strobe is activated for a predetermined period of time, such as fifty microseconds. The exposure time of the preparatory image is short with respect to the exposure time of a photographic image to reduce the effect of any ambient light on the preparatory image.

For example, the exposure time of the preparatory image is approximately one millisecond, while the exposure time of the photographic image is approximately 33.3 milliseconds ( $\frac{1}{30}$  second). The strobe is activated to generate the preparatory light shortly after the exposure time begins. In step 334, the activate strobe procedure 224 determines a photographic image strobe duration based on a preparatory luminance of the preparatory image. In step 336, the activate strobe procedure 240 acquires a photographic image by activating the strobe for the photographic image strobe duration. In step 338, after acquiring the photographic image, the image acquisition procedure 240 performs additional adjustments to the photographic image. For example, the image acquisition procedure 240 may adjust the white-balance and color balance, enhance the edges, the perform chroma suppression to whiten the white areas and darken the black areas of the photographic image.

In FIG. 6, a look-up table stored in the memory of FIG. 2, as identified in FIG. 3 is shown. The look-up table 226 stores a strobe duration 342 and an associated power value 344. The associated power value 344 represents a percentage of the luminance at the specified strobe duration divided by the luminance at a nominal strobe duration. In the look-up table, the first entry pair is 50 microseconds (s) with an associated power value of 100.0% and represents a nominal power value for a nominal average luminance at a preparatory strobe duration, which is discussed with reference to FIG. 10. The subsequent durations from 25 s to 800 s have power values that are relative to the first 50 s entry. For example, for a strobe duration of 25 s, the power value is 34.9% of the power value of at the nominal 50 s duration. Alternately, the associated power values 344 represent fractions rather than a percentage.

FIG. 7 is a flowchart of an activate strobe procedure of FIG. 3 and FIG. 5. Steps 352 and 354 of FIG. 7 provide more detail with respect to step 332 of FIG. 5. Steps 358–364 of FIG. 7 provide more detail with respect to step 334 of FIG. 5. In step 352, the activate strobe procedure 224 releases the shutter to cause the image sensor to accumulate charge representing an image. In one embodiment, the shutter is released electronically by applying the DumpCharge Signal of FIG. 4 to the image sensor 106 of FIG. 2 to remove any accumulated charge from the cells of the image sensor. In an alternate embodiment, a mechanical shutter is opened to allow the image sensor to receive light. In step 354, the activate strobe procedure 224 generates preparatory light by activating the strobe for a predetermined preparatory duration. In step 356, the activate strobe procedure 224 captures preparatory image data associated with the preparatory image. The activate strobe procedure 224 captures preparatory image data associated with the charge accumulated on the image sensor and stores the preparatory image data in the memory.

In step 358, the activate strobe procedure 224 determines an average block luminance for subsets of the preparatory

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image data. In one embodiment, steps 356 and 358 are performed concurrently. Alternately, steps 356 and 358 are performed sequentially. Preferably, the preparatory image has sixty-four subsets or blocks and each subset has an average block luminance. The blocks are rectangular and the number of pixels in a block varies depending on the size of the image sensor.

The pixels on the sensor are arranged behind a red-green-blue filter having a Bayer-pattern. The symbol “R” refers to a pixel behind the red filter, the symbol “G” refers to a pixel behind the green filter, and the symbol “B” refers to a pixel behind the blue filter. The arrangement of the filters and pixels is as follows:

R G R G R G . . .  
X  
G B G B G B . . .

A digital value corresponding to an intensity of the amount of light impinging on a pixel is stored in the memory. The intensity of a red pixel is  $I_R$ , the intensity of a

$$0.1I_B + 0.3I_R + 0.6I_G \quad (1)$$

green pixel is  $I_G$ , and the intensity of a blue pixel is  $I_B$ . The following relationship is used to determine the luminance for a group of pixels referred to as a spot, as designated by the “X” above:

Because there are two green pixels, the intensity  $I_G$  is equal to the average intensity of the two green pixels. Alternately, relationship one is modified by reducing the 0.6 factor to 0.3, and adding the intensity of the green pixels,  $I_{G1}$  and  $I_{G2}$ , as shown in relationship two as follows:

$$0.1I_B + 0.3I_R + 0.3(I_{G1} + I_{G2}) \quad (2)$$

Referring also to FIG. 8, the image data 230 has many blocks 380. Each block 380 includes a rectangular array of pixels. The luminance is determined for a plurality of spots 382 within each block 380. The plurality of spots is selected in accordance with a predetermined spot pattern. In this example, the spot pattern is four spots across an approximate horizontal centerline of the block 380, and six spots aligned with an approximate vertical centerline of the block 380. The image data for an exemplary group of pixels 384 is used to determine the luminance of the spot 382 using relationship one above. The luminance of the plurality of spots 382 is summed to generate the average block luminance for the block 380. In an alternate embodiment, the luminance of the plurality of spots 382 is summed to provide an intermediate sum that is divided by the number of spots in the plurality of spots to generate the average block luminance for block 380.

Referring back to FIG. 7, in step 360, the activate strobe procedure 224 applies a weight to the average block luminance by multiplying the average block luminance, for at least a subset of the blocks, by a respective weight from the luminance weighting table to generate weighted block luminances.

Referring to FIG. 9, an exemplary luminance weighting table of FIG. 3 is shown. Each block 380 is associated with a predetermined weight 386 in the luminance weighting table 228. The weights in the luminance weighting table 228 apply the greatest weight to the luminance values in the center foreground of the image, and especially enhance the visual quality of portraits. In an alternate embodiment, the weights of the luminance weighting table 228 are adjusted for other types of images such as landscapes. In another embodiment, the values in the luminance weighting table are adjusted in response to a user selecting the type of photo-

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graph they are taking. In yet another alternate exemplary luminance weighting table, the luminance weighting table provide uniform weights.

In step 362, the activate strobe procedure 224 sums the weighted block luminances to generate the average image weighted luminance value for the preparatory image data. In step 364, the activate strobe procedure 224 determines the photographic image strobe duration for the strobe by accessing the look-up table 226 of FIG. 6 in accordance with a relationship between the average image weighted luminance and a target luminance where the target luminance is equal to eighty. The activate strobe procedure 224 divides the target luminance by the average image weighted luminance to generate a target power factor. Since the strobe power is proportional to the luminance, the target power factor represents an increase or decrease in strobe power and results in a photographic image having sufficient image quality.

The activate strobe procedure 224 determines a preparatory power value associated with the preparatory strobe activation from the look-up table 226 of FIG. 6 from the first 50 s entry, and multiplies the preparatory power value by the target power factor to generate a photographic image power value. The activate strobe procedure 224 accesses the look-up table a second time to identify upper and lower calibration power values that are closest to the photographic image power value, and generates the photographic image strobe duration by performing a linear interpolation between the upper and lower power values and target value, and the respective upper and lower calibration durations. In an alternate embodiment, the activate strobe procedure 224 accesses the look-up table 226 a second time to identify a calibration power value closest to the photographic image power value, and sets the photographic image strobe duration equal to the duration associated with the identified calibration power value in the table 226.

When the activate strobe procedure 224 accesses the look-up table for the second time, the power values and durations for the second through final entries are used, and the power value and duration for the first 50 s entry is not used. Using the second through final entries provides a strobe duration for the photographic image that compensates for charge lost in the high voltage supply of the strobe circuit from activating the strobe for preparatory duration to acquire the preparatory image.

FIG. 10 is a flowchart of a calibrate look-up table procedure of FIG. 3 and FIG. 5. FIG. 10 provides more detail with respect to step 330 of FIG. 5. To calibrate the look-up table, the calibrate look-up table procedure 240 is loaded into the memory of the digital imager. The digital imager is placed in a darkened box that substantially eliminates ambient light, and is aimed at a test surface three feet away. The test surface is an eighteen percent gray surface, which reflects eighteen percent of the incident light.

In step 402, the calibrate look-up table procedure 240 determines a nominal average luminance at the preparatory strobe duration. The calibrate look-up table procedure 240 activates the strobe for the preparatory strobe duration a predetermined number of times, such as ten. After each activation of the strobe, the calibrate look-up table procedure 240 measures the average luminance for that activation. To measure the average luminance, a block of pixels in the center ten percent of the image sensor is identified. In one implementation, the block of pixels is ninety pixels wide and ninety pixels high. Because the eye is most sensitive to green, the green pixels in the block are used to determine the luminance. The intensity value of the green pixels in the block is summed and divided by the number of green pixels

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to generate the average luminance for a single activation of the strobe. After the strobe has been activated for the predetermined number of times, the average luminances are summed and divided by the predetermined number of strobe activations to generate the nominal average luminance. By generating the nominal average luminance by activating the strobe multiple times, deviations in the luminance are included in the average. However, in an alternate embodiment, when an average luminance exceeds an upper threshold value, or is below a lower threshold value for the calibration strobe duration, the strobe or strobe circuit may be defective, and the calibrate look-up table procedure 240 provides an operator with an indication of a possible defect.

After determining the nominal average luminance, the strobe is activated for various calibration durations. A relationship between the nominal average luminance and an average calibration luminance at various calibration durations is measured and stored in the look-up table. In step 404, the calibrate look-up table procedure 240 sets a calibration strobe duration equal to an initial calibration duration, such as twenty-five microseconds. In step 406, the calibrate look-up table procedure 240 sets the value of a calibration counter equal to zero. The calibration counter is used to count a number of times that the strobe is activated for a specified calibration duration.

In step 408, the strobe is activated for the preparatory strobe duration to discharge a capacitor in the high voltage supply in the strobe interface circuit. In this way, the look-up table is calibrated under conditions more closely resembling normal operation. After activating the strobe, the calibrate look-up table procedure 240 waits approximately fifty milliseconds. In step 410, the calibrate look-up table procedure 240 dumps any accumulated charge from the image sensor and releases the shutter to acquire an image, as described above. In step 412, the calibrate look-up table procedure 240 activates the strobe to generate calibration light for the specified calibration strobe duration. In step 414, the calibrate look-up table procedure 240 measures and stores the average luminance for the image at the specified calibration strobe duration, and also stores the associated calibration strobe duration. The average luminance is measured as previously described with respect to step 402. In step 416, the calibrate look-up table procedure 240 increments the value of calibration counter by one. In step 418, the calibrate look-up table procedure 240 determines whether the value of the calibration counter is equal to a predetermined maximum calibration count value (N). Preferably, the maximum calibration count value is greater than one. In an alternate embodiment, the maximum calibration count value is equal to two. Having more than one average luminance reduces the effect of aberrations in a measurement. If step 418 determines that the value of the calibration counter is not equal to the maximum calibration count value (N), steps 408 through 418 are repeated to generate an additional average luminance at the specified calibration strobe duration.

If step 418 determines that the value of the calibration counter is equal to the maximum calibration count value (N), then in step 420, the calibrate look-up table procedure 240 updates the look-up table for the calibration strobe duration. The calibrate look-up table procedure 240 generates a calibration average luminance by summing the average luminances for the specified calibration strobe duration and dividing that sum by the value of the calibration counter. The calibrate look-up table procedure 240 determines a percentage of the calibration average luminance with respect to the nominal average luminance, and stores the calibration strobe duration and percentage in the look-up table.



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In step 422, the calibrate look-up table procedure 240 increases the calibration strobe duration. In one embodiment, the calibration strobe duration is increased in equal increments. In another embodiment, the calibration strobe duration is increased non-linearly as follows: 25 microseconds (s), 50 s, 75 s, 100 s, 250 s, 500 s, 750 s and 1000 s. The initial calibration strobe duration is 25 microseconds. The calibration strobe duration is increased in 25 s increments until the calibration strobe duration equal 100 s. The calibration strobe duration is then increased to 250 s, and then increased in 250 s increments until the calibration strobe duration is equal to 1000 s. In another alternate embodiment, after measuring at the calibration strobe duration of 100 s, the calibration strobe duration is increased to 400 s and 800 s, as shown in FIG. 6. These calibration strobe durations were chosen because the strobe does not generate light linearly with respect to the duration of activation of the strobe. The greatest change in luminance is in the shorter strobe durations.

In step 424, the calibrate look-up table procedure 240 determines whether the calibration strobe duration is greater than a maximum strobe duration. If not, the calibrate look-up table procedure 240 repeats steps 406–424. If so, then the look-up table is calibrated.

In an alternate embodiment, the average luminance is determined using the red, green and blue color channels as described above with respect to FIG. 7, rather than only the green color channel. Although the strobe has been described with respect to an exemplary electronic digital camera, the strobe can be used with electronic scanners and copiers. In addition, the present invention can be used with portable electronic devices having an image sensor and light source to illuminate an object, such as a personal digital assistant (PDA). While various embodiments of the invention have been described, it will be apparent to those of ordinary skill in the art that many more embodiments and implementations are possible that are within the scope of this invention.

What is claimed is:

1. A method of adjusting image lighting, the method comprising:

generating a preparatory light for a predetermined preparatory duration;

capturing a preparatory image while generating the preparatory light, wherein the preparatory image is represented by preparatory image data;

determining an average preparatory image luminance of the preparatory image based on the preparatory image data and weighting at least a subset of the preparatory image data;

generating a supplemental strobe duration based on the average preparatory image luminance and luminance weightings; and

generating a look-up table storing associated image strobe durations and power values including a preparatory image strobe duration and associated preparatory power value.

2. The method of claim 1 wherein the generating the supplemental strobe duration further comprises:

generating average block luminances for subsets of the preparatory image data;

applying the luminance weightings to at least a subset of the average block luminances to generate weighted average block luminance; and

determining the average image luminance based on the weighted average block luminance.

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3. The method of claim 2 wherein the luminance weightings are stored in a weighting table, and the applying further comprises:

accessing the weighting table to retrieve respective luminance weightings corresponding to portions of the preparatory image; and

multiplying the average block luminance by the respective luminance weightings to provide the average weighted block luminance.

4. The method of claim 1, further comprising:

generating an adjustment factor by dividing a predetermined target luminance by the average image luminance;

multiplying the preparatory luminance power value by the adjustment factor to generate a target luminance power value; and

identifying, in the look-up table, an identified strobe duration corresponding to the target luminance power value, the identified strobe duration being the supplemental strobe duration.

5. The method of claim 1, wherein generating the supplemental strobe duration further comprises:

generating a light adjustment factor by dividing a predetermined target luminance by the average image luminance;

multiplying the preparatory power value by the light adjustment factor to generate a target look-up table power value;

identifying, from the look-up table, first and second look-up table power values that are greater and less than, respectively, the target look-up table power value, the first and second look-up table power values having associated first and second image strobe durations; and generating a final image strobe duration by interpolating the first and second image strobe durations in accordance with the target look-up table power value.

6. The method of claim 1 further comprising:

accessing the look-up table based on the average image luminance.

7. A memory having machine readable instructions for execution by a processor to adjust image lighting, the memory comprising:

a first set of machine readable instructions for acquiring a preparatory image while generating a preparatory light for a predetermined preparatory duration;

a second set of machine readable instructions for determining an average preparatory image luminance based on preparatory image data associated with the preparatory image and weighting at least a subset of the preparatory image data;

a third set of machine readable instructions for generating a supplemental strobe duration based on the average preparatory image luminance and luminance weightings; and

a set of machine readable instructions for generating a look-up table that stores associated image strobe durations and power values including a preparatory image strobe duration and an associated preparatory power value.

8. The memory of claim 7, wherein the machine readable instructions that generate the supplemental strobe duration further include:

a fourth set of machine readable instructions for generating average block luminances for subsets of the preparatory image data;

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a fifth set of machine readable instructions applying the luminance weightings to at least a subset of the average block luminances to generate weighted average block luminance; and

a sixth set of machine readable instructions for determining the average image luminance based on the weighted average block luminance.

9. The memory of claim 8, further comprising:

a seventh set of machine readable instructions for storing the luminance weightings in a weighting table;

a eighth set of machine readable instructions for accessing the weighting table to retrieve respective luminance weightings corresponding to portions of the preparatory image; and

a ninth set of machine readable instructions for multiplying the average block luminance by the respective luminance weightings to provide the average weighted block luminance.

10. The memory of claim 7, further comprising machine readable instructions that include:

an eleventh set of machine readable instructions for multiplying the preparatory luminance power value by the adjustment factor to generate a target luminance power value; and

a twelfth set of machine readable instructions for identifying, in the look-up table, an identified strobe duration corresponding to the target luminance power value, the identified strobe duration being the supplemental strobe duration.

11. The memory of claim 7, further comprising:

a fourteenth set of machine readable instructions for generating a light adjustment factor by dividing a predetermined target luminance by the average image luminance;

a fifteenth set of machine readable instructions for multiplying the preparatory power value by the light adjustment factor to generate a target look-up table power value;

a sixteenth set of machine readable instructions for identifying, from the look-up table, first and second look-up power values that are greater and less than, respectively, the target look-up table power value, the first and second look-up table power values having associated first and second image strobe durations; and

a seventeenth set of machine readable instructions for generating a final image strobe duration by interpolating the first and second image strobe durations in accordance with the target look-up table power value.

12. The memory of claim 7, wherein the instructions that determine the supplemental strobe duration access the look-up table based on the average image luminance and at least one luminance power value is used to generate the supplemental strobe duration.

13. The memory of claim 12, wherein the eighteenth set of machine readable instructions for generating the look-up table, include:

a nineteenth set of machine readable instructions for capturing a set of calibration images, each calibration image being associated with a predetermined calibration strobe duration, one calibration strobe duration being substantially equal to the preparatory image strobe duration; and

a twentieth set of machine readable instructions for generating power values corresponding to each calibration image with respect to a luminance value associated with the predetermined preparatory duration.

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14. A digital imaging system comprising:  
a processor electrically connected to a strobe;  
an image sensor coupled to a memory, where a supplemental strobe duration stored in the memory is generated from a preparatory image received at the processor from the image sensor when the strobe is activated to generate a preparatory light for a predetermined preparatory duration;

wherein the processor accesses a look-up table in the memory that stores image strobe durations and power values including a preparatory image strobe duration and an associated preparatory power value.

15. The digital image system of claim 14, wherein the processor divides the preparatory image data into subsets and generates average block luminances for each subset and applies the luminance weightings to at least a subset of the average block luminances, resulting in weighted average block luminance used to derive the weighted average block luminance.

16. The digital image system of claim 14, wherein the memory has a weighting table that stores the luminance weighting.

17. The digital image system of claim 14, wherein the processor generates an adjustment factor by dividing a predetermined target luminance by the average image luminance power value and then multiplying the adjustment factor by the preparatory luminance power value to derive the target luminance power value that corresponds to an identified strobe duration in the look-up table.

18. A method of adjusting image lighting on a preparatory image, the method comprising:

generating a preparatory light for a predetermined preparatory duration;

determining an average preparatory image luminance of the preparatory image represented by preparatory image data based on the preparatory image data and weighting at least a subset of the preparatory image data;

generating a supplemental strobe duration based on the average preparatory image luminance and luminance weightings;

generating a look-up table storing associated image strobe durations and power values including a preparatory image strobe duration and associated preparatory power value;

generating an adjustment factor by dividing a predetermined target luminance by the average image luminance;

multiplying the preparatory luminance power value by the adjustment factor to generate a target luminance power value; and

identifying, in the look-up table, an identified strobe duration corresponding to the target luminance power value, the identified strobe duration being the supplemental strobe duration.

19. A method of adjusting image lighting on a preparatory image, the method comprising:

generating a preparatory light for a predetermined preparatory duration;

determining an average preparatory image luminance of the preparatory image represented by preparatory image data based on the preparatory image data and weighting at least a subset of the preparatory image data; and

generating a supplemental strobe duration based on the average preparatory image luminance and luminance

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weightings, wherein generating the supplemental strobe duration further comprises

generating a look-up table storing associated image strobe durations and luminance power values including a preparatory image strobe duration and a preparatory power value;

generating a light adjustment factor by dividing a predetermined target luminance by the average image luminance;

multiplying the preparatory power value by the light adjustment factor to generate a target look-up table power value;

identifying, from the look-up table, first and second look-up table power values that are greater and less than, respectively, the target look-up table power value, the first and second look-up table power values having associated first and second image strobe durations; and

generating a final image strobe duration by interpolating the first and second image strobe durations in accordance with the target look-up table power value.

20. A method of adjusting image lighting on a preparatory image, the method comprising:

generating a preparatory light for a predetermined preparatory duration;

determining an average preparatory image luminance of the preparatory image represented by preparatory image data based on the preparatory image data and weighting at least a subset of the preparatory image data;

generating a supplemental strobe duration based on the average preparatory image luminance and luminance weightings;

generating a look-up table storing associated image strobe durations and luminance power values including a preparatory image strobe duration and a preparatory power value; and

accessing the look-up table based on the average image luminance.

21. A memory having machine readable instructions for execution by a processor to adjust image lighting on a preparatory image, the memory comprising:

a first set of machine readable instructions for acquiring a preparatory image;

a second set of machine readable instructions for determining an average preparatory image luminance based on preparatory image data associated with the preparatory image and weighting at least a subset of the preparatory image data;

a third set of machine readable instructions for generating a supplemental strobe duration based on the average preparatory image luminance and luminance weightings;

a fourth set of machine readable instructions for generating a look-up table that stores associated image strobe durations and power values including a preparatory image strobe duration and an associated preparatory power value;

a fifth set of machine readable instructions for multiplying the preparatory luminance power value by the adjustment factor to generate a target luminance power value; and

a sixth set of machine readable instructions for identifying, in the look-up table, an identified strobe duration

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corresponding to the target luminance power value, the identified strobe duration being the supplemental strobe duration.

22. A memory having machine readable instructions for adjusting image lighting on a preparatory image, the memory comprising:

a first set of machine readable instructions for acquiring a preparatory image;

a second set of machine readable instructions for determining an average preparatory image luminance based on preparatory image data associated with the preparatory image and weighting at least a subset of the preparatory image data;

a third set of machine readable instructions for generating a supplemental strobe duration based on the average preparatory image luminance and luminance weightings;

a fourth set of machine readable instructions for generating a look-up table that stores associated image strobe durations and luminance power values including a preparatory image strobe duration and a preparatory power value;

a fifth set of machine readable instructions for generating a light adjustment factor by dividing a predetermined target luminance by the average image luminance;

a sixth set of machine readable instructions for multiplying the preparatory power value by the light adjustment factor to generate a target look-up table power value;

a seventh set of machine readable instructions for identifying, from the look-up table, first and second look-up power values that are greater and less than, respectively, the target look-up table power value, the first and second look-up table power values having associated first and second image strobe durations; and

a eighth set of machine readable instructions for generating a final image strobe duration by interpolating the first and second image strobe durations in accordance with the target look-up table power value.

23. A memory having machine readable instructions for adjusting image lighting on a preparatory image, the memory comprising:

a first set of machine readable instructions for acquiring a preparatory image;

a second set of machine readable instructions for determining an average preparatory image luminance based on preparatory image data associated with the preparatory image and weighting at least a subset of the preparatory image data;

a third set of machine readable instructions for generating a supplemental strobe duration based on the average preparatory image luminance and luminance weightings; and

a fourth set of machine readable instructions for generating a look-up table that stores associated image strobe durations and luminance power values including a preparatory image strobe duration and a preparatory power value, wherein the instructions that determine the supplemental strobe duration access the look-up table based on the average image luminance and at least one luminance power value is used to generate the supplemental strobe duration.

24. The memory of claim 23, wherein the fourth set of machine readable instructions for generating the look-up table, include:

a fifth set of machine readable instructions for capturing a set of calibration images, each calibration image being associated with a predetermined calibration

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strobe duration, one calibration strobe duration being substantially equal to the preparatory image strobe duration; and

a sixth set of machine readable instructions for generating power values corresponding to each calibration image with respect to a luminance value associated with the predetermined preparatory duration.

25. A digital imaging system comprising:

a processor electrically connected to a strobe; and

an image sensor coupled to a memory, where a supplemental strobe duration stored in the memory is generated from a preparatory image received at the processor from the image sensor when the strobe is activated to generate a preparatory light for a predetermined preparatory duration;

wherein the processor accesses a look-up table in the memory that stores image strobe durations and power values including a preparatory image strobe duration

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and an associated preparatory power value to generate an adjustment factor by dividing a predetermined target luminance by the average image luminance power value and then multiplying the adjustment factor by the preparatory luminance power value to derive the target luminance power value that corresponds to an identified strobe duration in the look-up table.

26. The method of claim 1 wherein, the capturing captures a single preparatory image.

27. The memory of claim 7, wherein the first set of machine readable instructions acquires a single preparatory image.

28. The digital image system of claim 14, wherein the supplemental strobe duration stored in the memory is generated from a single preparatory image.

\* \* \* \* \*

# **EXHIBIT 7**

**IN THE UNITED STATES DISTRICT COURT  
FOR THE EASTERN DISTRICT OF TEXAS  
SHERMAN DIVISION**

IMPERIUM IP HOLDINGS (CAYMAN),  
LTD.,

*Plaintiff,*

V.

SAMSUNG ELECTRONICS CO., LTD.,  
SAMSUNG ELECTRONICS AMERICA,  
INC., SAMSUNG  
TELECOMMUNICATIONS AMERICA,  
LLC, and SAMSUNG SEMICONDUCTOR,  
INC.,

*Defendants.*

Case Number: 4:14-cv-00371-ALM

**PLAINTIFF IMPERIUM IP HOLDINGS (CAYMAN), LTD.'S  
PATENT RULE 3-1 AND 3-2 DISCLOSURES**

Pursuant to Patent Rule 3-1 and 3-2, Plaintiff Imperium IP Holdings (Cayman), Ltd. (“Imperium”) hereby submits its Disclosure of Asserted Claims and Infringement Contentions and accompanying disclosure against defendants Samsung Electronics Co., Ltd., Samsung Electronics America, Inc., Samsung Telecommunications America, LLC, and Samsung Semiconductor, Inc. (collectively, “Samsung Electronics”).

## 1. Identification of Asserted Claims

Based on the information presently available, Imperium hereby discloses, pursuant to P.R. 3-1(a), the claims of each patent-in-suit that it contends are infringed by Samsung Electronics as follows:

United States Patent No. 6,271,884: Claims 1-6, 14, 17-19.

United States Patent No. 7,092,029: Claims 1, 6, 7, 14, 16.

United States Patent No. 6,836,290: Claims 1, 10.

Imperium expressly reserves the right to modify, amend, and/or supplement the foregoing in light of the discovery that Samsung Electronics produces, none of which has been provided at present, and/or based on the Court's claim construction.

## **2. Identification of Accused Apparatuses**

Based on the information presently available, Imperium hereby discloses, pursuant to P.R. 3-1(b), the following accused apparatuses, products, devices, processes, methods, acts or other instrumentalities of which it is currently aware and that it contends infringe, either directly, indirectly, contributorily or by inducement, the asserted claims of the patents-in-suit: Alias, ATIV Book 8, ATIV Book 9, ATIV Book 9 Lite, ATIV Book 9 Plus, ATIV S, CL65, Conquer 4G, Galaxy Ace, Galaxy Alpha, Galaxy Camera, Galaxy Camera 2, Galaxy Nexus, Galaxy Note 2, Galaxy Note 3, Galaxy Note 4, Galaxy Note Edge, Galaxy Portal, Galaxy S II Epic 4G Touch, Galaxy S2, Galaxy S3, Galaxy S4, Galaxy S4 Mini, Galaxy S5, Galaxy S5 Active, Galaxy S5 Sport, Galaxy Stellar, Galaxy Tab 10.1, Galaxy Tab 10.1v, Galaxy Tab 2 10.1, Galaxy Tab 2 7.0, Galaxy Tab 7.0, Galaxy Tab 7.7, Galaxy Tab 8.9, Galaxy Wi-Fi Camera, Galaxy NX, NX-5, NX-10, NX-100, NX-1000, NX-11, NX-1100, NX-20, NX-200, NX-2000, NX-210, NX-30, NX-300, Intensity II, MV900, MV900F, Nexus S, NP-R580, NP-RC512, Pixon 12, Series 3, Series 5, Series 5 Ultratouch, Series 6, Series 7, Series 7 Chronos, Series 9, W350, WB350F, WB800F, WB850F, WB855F, Digimax S500, Digimax S600, DV150F, DV300F, ES80, ES81, EX2F, GX-10, GX-20, HZ10W, HZ15W, i85, L100, L200, NV11, NV15, NV3, NV4, NV40, PL90, PL120, PL121, PL170, PL171, PL20, PL21, PL210, PL211, S630, S730, S750, S73, S760, S85, S850, S860, SH100, SL102, SL202, SL30 SL40, SL420, SL50, SL600, SL605, SL720, SL820, ST150F, ST151F, ST152F, ST72, ST73, ST200F, ST600, ST65, ST67, ST66, ST68, ST700, ST75, ST76, ST77, ST78, ST79, ST90, ST91, TL105, TL110, TL205, TL210,



TL220, TL225, TL320, TL350, TL90, WB100, WB101, WB150, WB150F, WB200F, WB201F, WB202F, WB210, WB2100, WB2200F, WB250, WB250F, WB30F, WB31F, WB32F, WB350, WB350F, WB750, WB800F, WB850F, WB855F. Each of the foregoing products is also identified in the claim charts attached as Appendices 1.1-1.63, 2.1-2.130, and 3.1-3.64.

In addition, Imperium asserts that various other mobile phones, tablet computers, laptop computers, cameras, and other devices with image sensors and image processors incorporated therein made, used, sold, offered for sale and/or imported by Samsung Electronics infringe the asserted claims of the patents-in-suit in the same or a substantially similar manner (including, but not limited to, by incorporating the same image sensors and/or image processors therein), which will be revealed during discovery.

Imperium expressly reserves the right to modify, amend, or supplement the foregoing list of accused apparatuses in light of the discovery that Samsung Electronics produces, none of which has been provided at present, and/or based on the Court's claim construction.

### **3. Claim Charts**

Pursuant to P.R. 3-1(c), Imperium attaches hereto the following exhibits identifying in chart form where each element of each asserted claim is found within the accused instrumentalities identified above: Appendices 1.1-1.63 ('884 patent); Appendices 2.1-2.130 ('029 patent); Appendices 3.1-3.64 ('290 patent).

Imperium expressly reserves the right to modify, amend, or supplement the foregoing claim charts in light of the discovery that Samsung Electronics produces, none of which has been provided at present, and/or based on the Court's claim construction.

### **4. Literal Infringement or Infringement Under the Doctrine of Equivalent**

Pursuant to P.R. 3-1(d), Imperium asserts that each element of each claim is literally present in each of the accused instrumentalities. To the extent any claim is found not be literally



Date: January 26, 2015

Respectfully submitted,

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**EXHIBITS 8-20**  
**Redacted in Their**  
**Entirety**

# **EXHIBIT 21**



To narrow this case for trial, Imperium respectfully submits this Notice of Asserted Claims and Accused Products.

Imperium will assert only the following claims at trial:

Patent	Asserted Claims
'290 Patent	1, 10
'884 Patent	1, 5, 6, 14, 17, 18, 19
'029 Patent	1, 6, 7

Imperium will not accuse the following Samsung products of infringement at trial: ATIV Book 8, ATIV Book 9, ATIV Book 9 Lite, Series 5 Ultratouch, Series 6, Series 7 (non-Chronos), Series 9, ES80, EX2F, Galaxy Camera, Galaxy NX, Galaxy Wi-Fi Camera, HZ10W, HZ15W, MV900F, NV4, NV15, NV40, PL90, PL170, S85, S630, S730, SL40, SL720, SL820, ST90, ST200F, ST600, and TL90.

Imperium reserves the right to further narrow the case prior to trial.

Dated: November 25, 2015

Respectfully submitted,

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**EXHIBITS 22-23**  
**Redacted in Their**  
**Entirety**

# **EXHIBIT 24**





SAMSUNG

GT-N7100

# User Manual

[www.samsung.com](http://www.samsung.com)

SAM-371\_00044608

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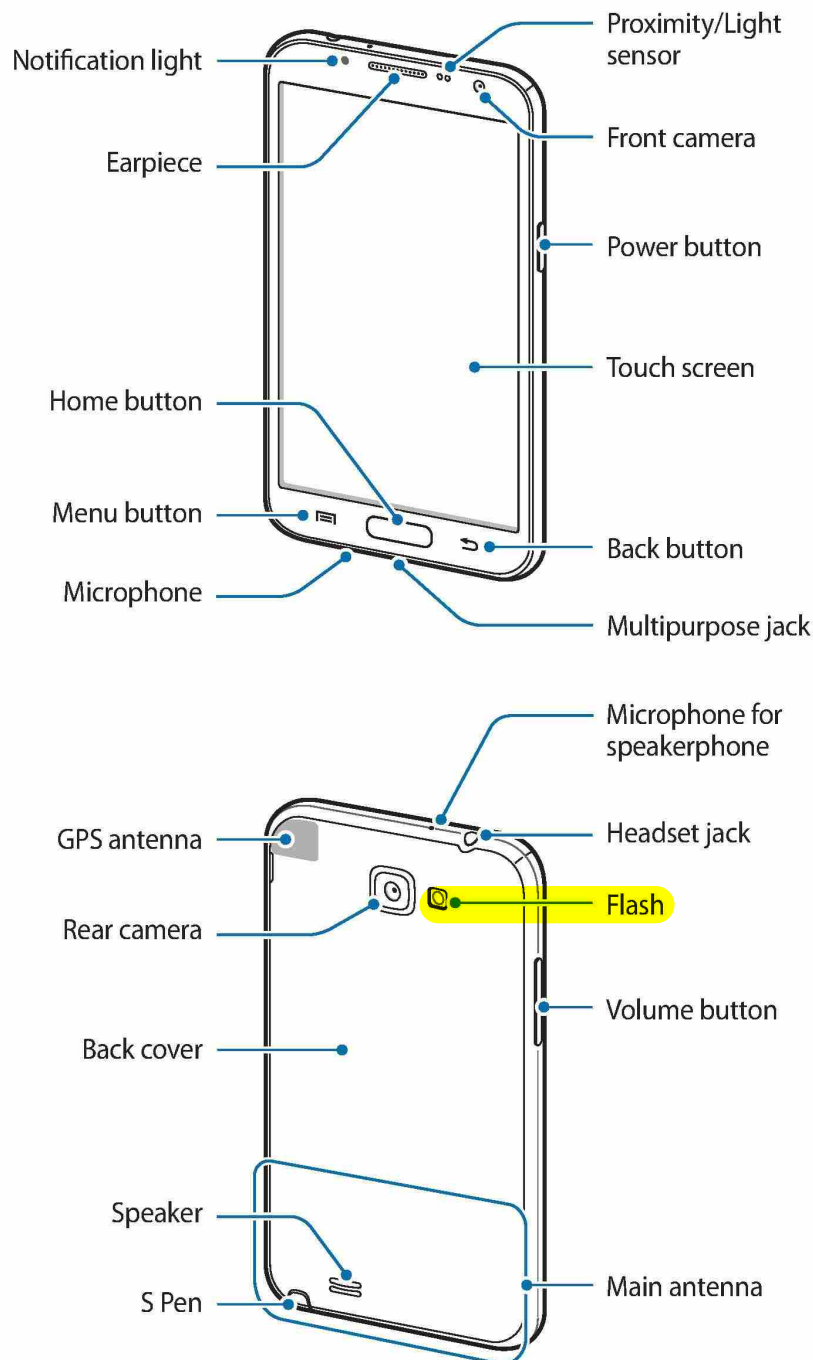
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# Getting started

## Device layout



# **EXHIBIT 25**



SAMSUNG

SM-N750

# User Manual

[www.samsung.com](http://www.samsung.com)

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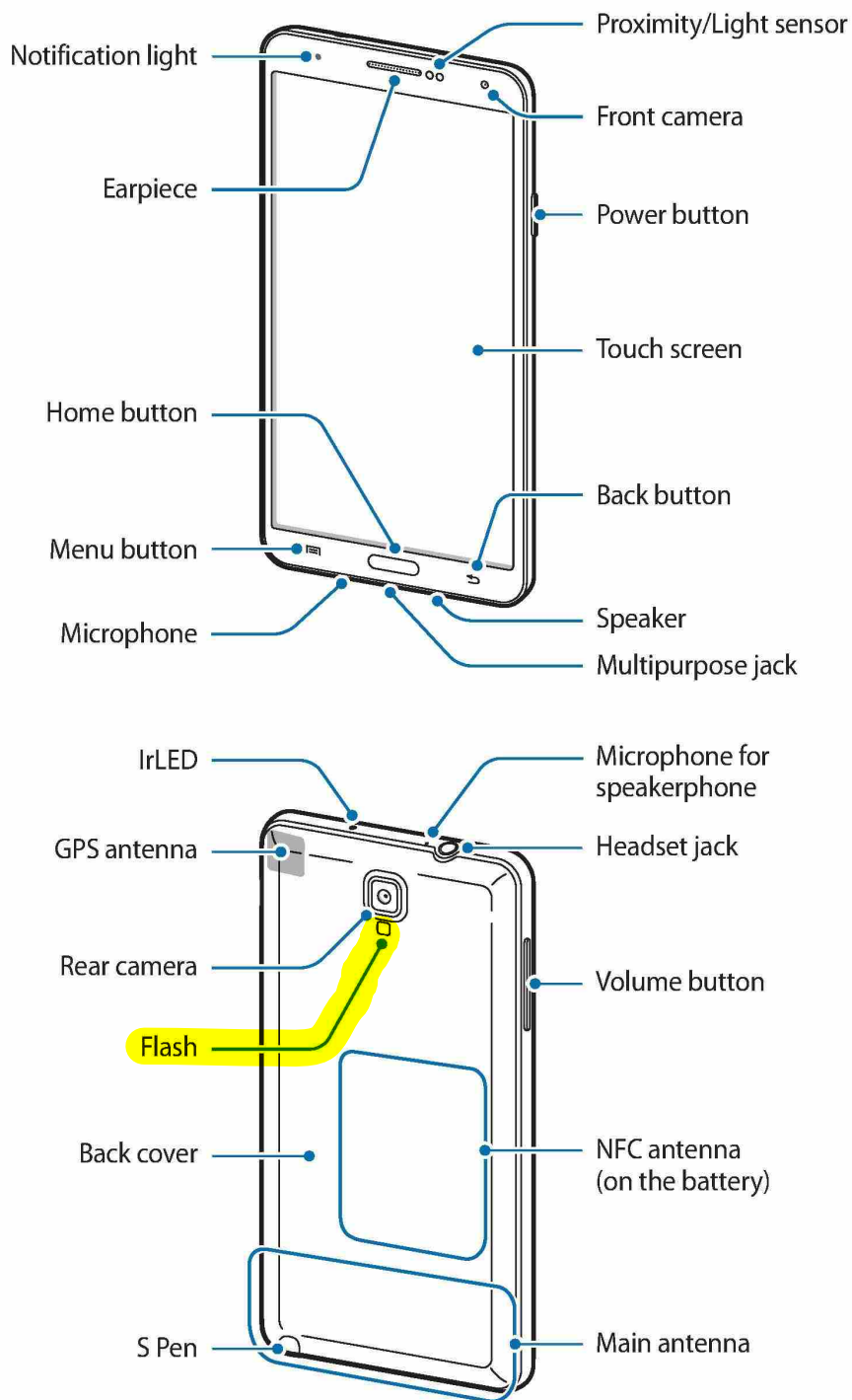
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# **EXHIBIT 26**

# Samsung GALAXY Note<sup>®</sup> 4

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S M A R T P H O N E

## User Manual

Please read this manual before operating your device  
and keep it for future reference.



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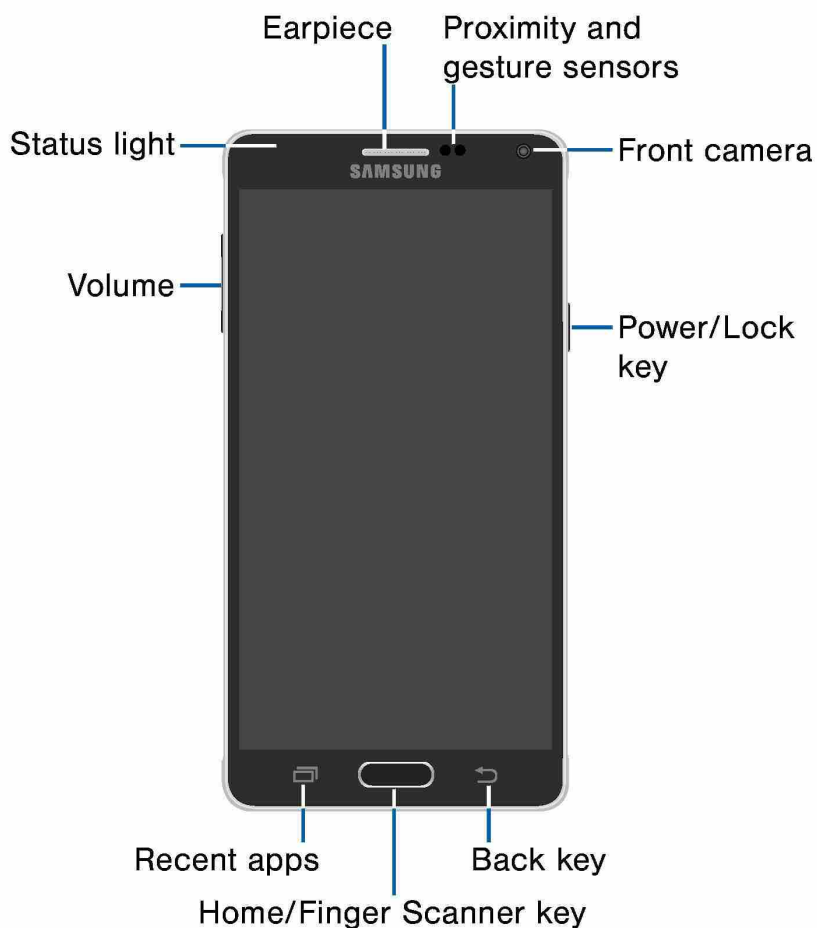
# Getting Started

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*Learn about your mobile device hardware, assembly procedures, and how to get started using your new device.*

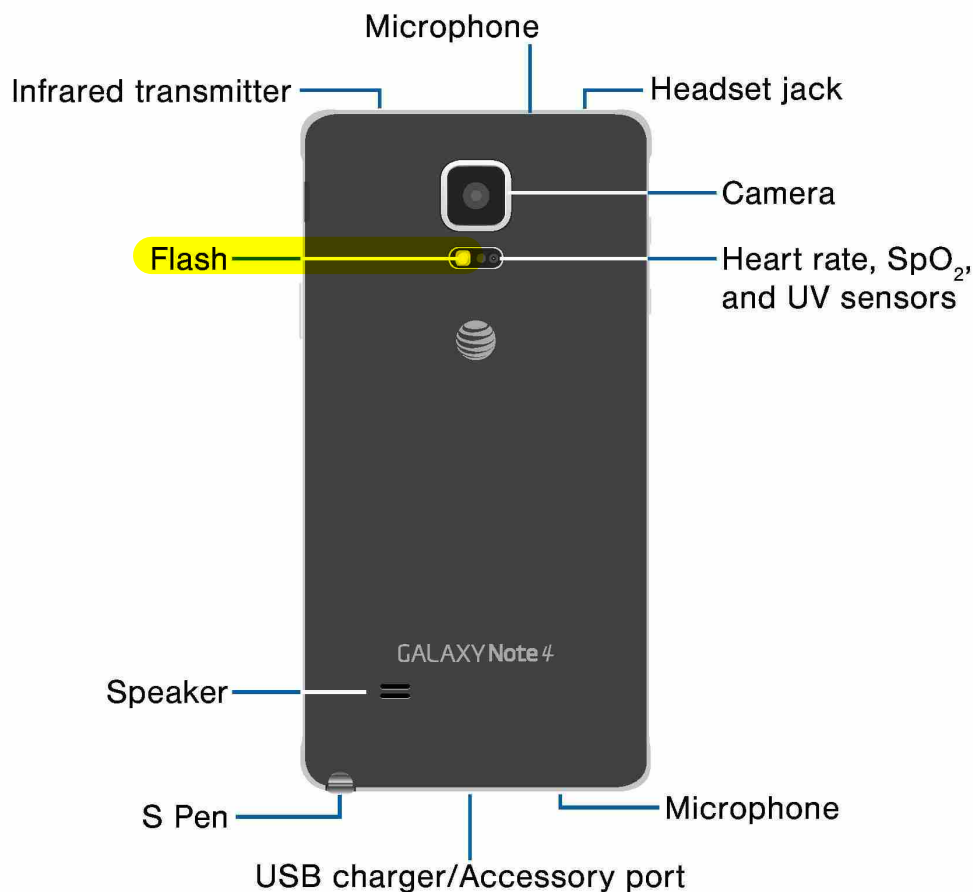


## Front View



- **Back key:** Tap to return to the previous screen, or to close a dialog box, menu, or keyboard.
- **Earpiece:** Listen to a call.
- **Front camera:** Take self-portraits and record videos of yourself.
- **Home/Finger Scanner key:** Tap to return to the Home screen. Activate the Fingerprint security feature.
- **Proximity and gesture sensors:** Detects the presence of objects near the device.
- **Recent apps:** Tap to display recent apps or touch and hold for home screen options.
- **Power/Lock key:** Press and hold to turn the device on or off. Press to lock or wake up the screen. Press and hold to turn the device off or restart it, or for quick access to Airplane Mode, Emergency Mode, and to Mute, Vibrate, and Sound modes.
- **Status Light:** Displays red when charging or the battery is low, blue when a notification has arrived or you are voice recording, and green when fully charged.
- **Volume:** Press to adjust the volume of your device's sounds and audio.

## Back View



- **Camera:** Take pictures and record videos.
- **Flash:** Illuminate subjects in low-light environments when taking a photo or recording video.
- **Heart rate, SpO<sub>2</sub>, and UV sensors:** When using the S Health app, these sensors are used to measure your heart rate, SpO<sub>2</sub> level (oxygen saturation), and the outdoor UV levels.
- **Headset jack:** Connect an optional headset (not included).
- **Infrared transmitter:** Controls external devices using infrared light.
- **Microphone:** Records audio and detects voice commands.
- **S Pen:** A stylus that assists you in performing various functions.
- **Speaker:** Plays music and other sounds.
- **USB charger/Accessory port:** Connect the Charger/USB cable (included), and other optional accessories (not included).

# **EXHIBIT 27**

# Samsung GALAXY Note<sup>®</sup> Edge

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S M A R T P H O N E

## User Manual

Please read this manual before operating your device  
and keep it for future reference.



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# Getting Started

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*Learn about your mobile device hardware, assembly procedures, and how to get started using your new device.*



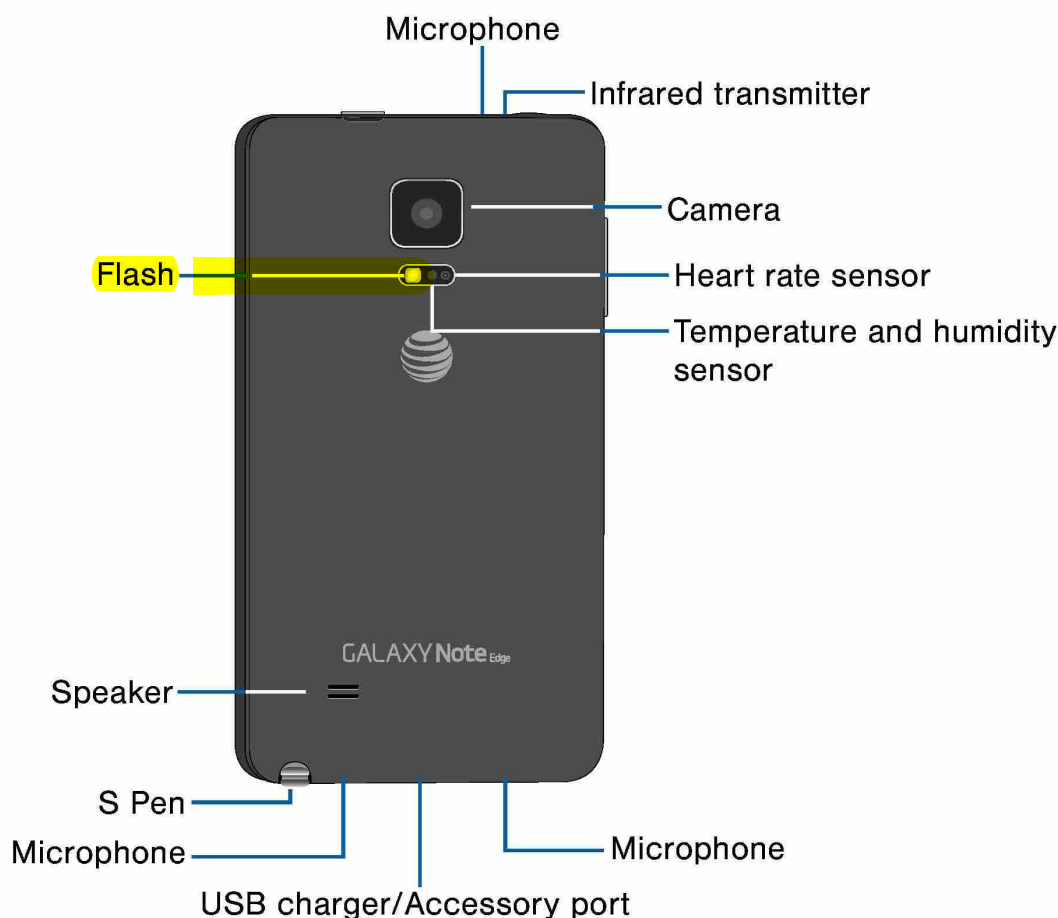
## Front View



- **Back key:** Tap to return to the previous screen, or to close a dialog box, menu, or keyboard.
- **Earpiece:** Listen to a call.
- **Edge screen:** Provides quick access to frequently used apps, alerts, notifications, and device functionality all with the swipe of a thumb.
- **Front camera:** Take self-portraits and record videos of yourself.
- **Headset jack:** Connect an optional headset (not included).
- **Home key:** Tap to return to the Home screen. Activate the Fingerprint security feature.
- **Proximity and gesture sensors:** Detects the presence of objects near the device.
- **Recent apps:** Tap to display recent apps or touch and hold for home screen options.
- **Power/Lock key:** Press and hold to turn the device on or off. Press to lock or wake up the screen. Press and hold to turn the device off or restart it, or for quick access to Airplane Mode, Emergency Mode, and to Mute, Vibrate, and Sound modes.
- **Status Light:** Displays red when charging or the battery is low, blue when a notification has arrived or you are voice recording, and green when fully charged.
- **Volume:** Press to adjust the volume of your device's sounds and audio.



## Back View



- **Camera:** Take pictures and record videos.
- **Flash:** Illuminate subjects in low-light environments when taking a photo or recording video.
- **Heart Rate Sensor:** When using the S Health app, this sensor measures your heart rate via your fingertip.
- **Infrared transmitter:** Controls external devices using infrared light.
- **Microphone:** Records audio and detects voice commands.
- **S Pen:** A stylus that assists you in performing various functions.
- **Speaker:** Plays music and other sounds.
- **Temperature and humidity sensor:** Monitors both temperature and humidity conditions. This is used to calculate calories burned within S Health.
- **USB charger/Accessory port:** Connect the Charger/USB cable (included), and other optional accessories (not included).

# **EXHIBIT 28**

# Samsung GALAXY S<sup>®</sup>5

4 G L T E S M A R T P H O N E

## User Manual

Please read this manual before operating your  
phone, and keep it for future reference.



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**A854**

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### Front View



16


1. **Indicator light** illuminates with a series of distinct colors and flashing patterns to indicate different notifications and statuses. Events include Charging, Low battery, and Missed event:
  - Powering on and Missed Notification (Call or Messaging)- **blue** blinks
  - Battery Charging - **red** remains on
  - Low Battery or Charging Error- **red** blinks
  - Battery Fully Charged - **green** remains on
2. **Light (RGB) Sensor** lets you use the ambient light level to adjust the screen brightness/contrast. This sensor decreases screen brightness in dim light.
  - In a bright light condition (outdoors), the sensors cause the device to increase the brightness and contrast for better viewing.
  - In dim light conditions, the device decreases the screen brightness to compensate.
3. **Volume key** allows you to adjust the ringer volume in standby mode (with the phone open) or adjust the voice volume during a call. When receiving an incoming call:
  - Pressing the volume key down mutes the ring tone.

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SAM-371\_00046685

4. **Application icons** are shortcuts to your favorite applications on the Home screen.
5. **Recent key** displays a list of recently opened apps and provides access to the Task Manager.
6. **Home key** displays the Home screen when pressed. Press and hold to display Google Search. Double-press to activate S Voice.
7. **Microphone - bottom** is used during phone calls and allow other callers to hear you clearly when you are speaking to them.
8. **USB Power/Accessory connector** allows you to connect a power cable or optional accessories such as a USB/ data cable.
9. **Back key** re-displays the previous screen or clears entries.
10. **Primary Shortcuts** allow quick access to important features such as Phone, Contacts, Messaging, Internet, and Apps.
11. **Home screen indicator** shows which Home screen is presently displayed.
12. **Google Quick Search bar** provides a shortcut to Google Search that allows you to search for items on the internet.
13. **Widgets** are self-contained onscreen applications (not shortcuts). These can be placed onto any of the available screens (Home or extended).



**14. Power/End key**  ends a call or switches the phone off and on. Press and hold for two seconds to:

- Access the audio modes for the device. Tap an onscreen selection (Mute, Vibrate, or Sound).
- Turn the device On or Off .
- Enable Airplane mode .
- Restart the device .
- Enable Emergency mode .

**15. Status bar** shows the information needed to operate your phone, such as the received signal strength, phone battery level, time, unread Emails, missed calls, etc.

**16. Front Facing Camera** allows you to take pictures while facing the screen and allows you to video conference.

**17. Gestures Sensor** used to detect Air View and Air Gesture motions.

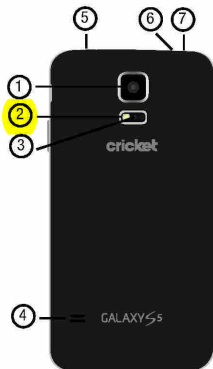
**18. Proximity Sensor** detects how close an object is to the surface of the screen. This is typically used to detect when your face is pressed up against the screen, such as during a phone call.

- While talking on the phone, the sensor detects talk activity and locks the keypad to prevent accidental key presses.

**19. Receiver** allows you to hear the other caller.

**20. Microphone - top** used while an active call is in the speakerphone mode and assists in noise cancellation (2 microphone solution).

### Back View



1. **Camera lens** is used to take photos.
2. **Flash** is used to take photos in low-light conditions.
3. **Heart Rate Sensors**, when using the S Health app, these sensors measure your heart rate via your fingertip. For information on the S Health app, see *"S Health"* on page 120.
4. **External speaker** allows you to hear ringers, music, and other sounds offered by your phone.
5. **Headset jack** allows you to connect a hands-free headset so you can listen to music.
6. **Temperature and Humidity sensor** allows your device to read both temperature and humidity conditions. This is useful to calculate calories burned within S Health.
7. **IR Transmitter** used to emit infrared signals used for controlling external devices. For more information, refer to *"Smart Remote"* on page 122.

# **EXHIBIT 29**

## **Redacted in Its Entirety**

# **EXHIBIT 30**

Page 1	Page 3
<p>UNITED STATES DISTRICT COURT EASTERN DISTRICT OF TEXAS SHERMAN DIVISION</p> <p>IMPERIUM IP HOLDINGS (CAYMAN) : DOCKET NO. 4:14CV371 VS. : SHERMAN, TEXAS : FEBRUARY 2, 2016 SAMSUNG ELECTRONICS CO. : MORNING SESSION</p> <p>TRANSCRIPT OF TRIAL BEFORE THE HONORABLE AMOS L. MAZZANT, UNITED STATES DISTRICT JUDGE, AND A JURY</p> <p>APPEARANCES:</p> <p>FOR THE PLAINTIFF: MR. ALAN MICHAEL FISCH MR. ROY WILLIAM SIGLER MR. JEFFREY SALTMAN MR. JOHN T. BATTAGLIA FISCH SIGLER 5301 WISCONSIN AVENUE NW FOURTH FLOOR WASHINGTON, DC 20015 MR. DAVID MICHAEL SAUNDERS MR. S. DESMOND JUI MR. SRULI YELLIN FISCH SIGLER 96 N. THIRD STREET, SUITE 260 SAN JOSE, CA 95112</p> <p>MS. SILVIA JORDAN FISCH SIGLER 505 EIGHTH AVE, 12TH FLOOR NEW YORK, NY 10018</p> <p>FOR THE DEFENDANT: MR. JESSE J. JENNER MR. CHRISTOPHER JOHN HARNETT MR. STEVEN PEPE MR. KEVIN JOHN POST MR. ALEXANDER ERNEST MIDDLETON ROPES &amp; GRAY 1211 AVENUE OF THE AMERICAS NEW YORK, NY 10036</p>	<p>(Jury out.)</p> <p>THE COURT: Good morning. Be seated.</p> <p>Now, did y'all discuss issues regarding time, the issue we brought up? Have y'all come to some kind of agreement on that issue?</p> <p>MR. FISCH: A partial agreement, an agreement to split the remaining time, Your Honor, but the disagreement is about how much time may actually be remaining.</p> <p>As Your Honor knows from the final pretrial conference, it was always my view that this could be done in five days and we would go to close Friday morning.</p> <p>I understand that Samsung would like additional time. I'm fine going to Monday for the close, but what I'd rather not do is extend the trial day. As Your Honor knows, this is dense material, even by patent law standards, and grinding our jurors out for another 90 minutes isn't going to make them any better at making the decision, and it's certainly not going to ingratiate them to anyone here.</p> <p>THE COURT: Mr. Siebman?</p> <p>MR. SIEBMAN: Yes, Your Honor. We -- we looked very, very carefully at our case last night, and we think that we need 16 hours in order to -- to put our case on.</p> <p>The Plaintiff, as -- as they have the right to do, I suppose, has -- has started removing a lot of material that we were planning on -- for example, as the Court noticed</p>
Page 2	Page 4
<p>MR. SAMUEL LAWRENCE BRENNER MR. SCOTT STEPHEN TAYLOR ROPES &amp; GRAY PRUDENTIAL TOWER 800 BOYLSTON STREET BOSTON, MA 02199</p> <p>MS. REBECCA R. CARRIZOSA ROPES &amp; GRAY 1900 UNIVERSITY AVE 6TH FLOOR EAST PALO ALTO, CA 94303 MR. CLYDE MOODY SIEBMAN MR. LARRY PHILLIPS SIEBMAN BURG PHILLIPS &amp; SMITH 300 N. TRAVIS SHERMAN, TX 75090</p> <p>COURT REPORTER: MS. JUDITH WERLINGER DEPUTY OFFICIAL REPORTER 101 E. PECAN #110 SHERMAN, TEXAS 75090</p> <p>PROCEEDINGS REPORTED BY MECHANICAL STENOGRAPHY, TRANSCRIPT PRODUCED BY COMPUTER-AIDED TRANSCRIPTION.</p>	<p>yesterday at the end of the day, we discussed that issue, so we're having to put some of that material back on in order to -- to put other things in context.</p> <p>So there's a lot of moving pieces that we're -- that we're reacting to. They're taking people off their witness list that we had planned to -- that we thought they were going to put on and we were going to cross, but we're now going to have to -- to figure out how to address that to -- to put that in context with the cross.</p> <p>And so not only do we need that time, but, you know, we're being challenged -- we really need more time, but we understand the Court doesn't have more time. But we don't think we can get below -- we think we need 16 hours.</p> <p>THE COURT: Okay. So what are you proposing?</p> <p>MR. SIEBMAN: I think --</p> <p>MR. FISCH: I'm sorry. I didn't know who the question was directed to.</p> <p>THE COURT: I will give you both a chance, but --</p> <p>MR. SIEBMAN: If we go to 6 o'clock for trial days, I think -- I think we can get there and get it done by Monday.</p> <p>THE COURT: Okay.</p> <p>MR. SIEBMAN: Or -- or alternatively, if the Plaintiff only needs 12 hours for their case, you know, we might could figure out how -- if they use 12 hours, we might -- if we need 16 and they need -- I haven't done the math on it.</p>

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<p>1 QUESTION: And LP mode is single-ended mode, right?</p> <p>2 ANSWER: Yes.</p> <p>3 QUESTION: So D-PHY can be operated in single-ended</p> <p>4 mode, differential mode, right, sir?</p> <p>5 ANSWER: Yes.</p> <p>6 (End of video clip.)</p> <p>7 THE COURT: Okay. Does that conclude that</p> <p>8 deposition?</p> <p>9 Would you like to call your next witness?</p> <p>10 MR. FISCH: Thank you, Your Honor.</p> <p>11 We'd like to call Dr. Cameron Wright, please.</p> <p>12 THE COURT: Sir, would you raise your right hand and</p> <p>13 be sworn in.</p> <p>14 (Witness sworn.)</p> <p>15 THE COURT: Go ahead.</p> <p>16 MR. FISCH: Thank you, Your Honor.</p> <p>17 CAMERON WRIGHT, Ph.D., PLAINTIFF'S WITNESS, SWORN</p> <p>18 DIRECT EXAMINATION</p> <p>19 BY MR. FISCH:</p> <p>20 Q. Good morning, Dr. Wright.</p> <p>21 A. Good morning, sir.</p> <p>22 Q. Could you please introduce yourself to the jury?</p> <p>23 A. Yes, sir. I'm Dr. Cameron Wright.</p> <p>24 Q. And, Dr. Wright, I understand you've prepared some</p> <p>25 materials for your testimony today, is that correct?</p>	<p>1 Could you share some of your experiences with us as</p> <p>2 well?</p> <p>3 A. Yes, sir. You see on the screen I've spent -- I spent</p> <p>4 many years as a research and development engineer in the Air</p> <p>5 Force working on a variety of projects, some -- some</p> <p>6 classified.</p> <p>7 My roles ranged from design engineer, lead engineer,</p> <p>8 chief engineer, but what's important to this discussion here</p> <p>9 is it involved technologies that included various types of</p> <p>10 interfaces and computers and cameras and imaging and so</p> <p>11 forth.</p> <p>12 After a number of assignments in that role, I was</p> <p>13 selected to be a professor of electrical engineering at the</p> <p>14 Air Force Academy where I taught classes to the cadets.</p> <p>15 That, again, included topics including interfaces and</p> <p>16 cameras and imaging systems and lighting and things of that</p> <p>17 nature.</p> <p>18 And after a time there at the Air Force Academy, I was</p> <p>19 recruited by the University of Wyoming, and I've been there</p> <p>20 at the faculty at the University of Wyoming for about</p> <p>21 13 years, teaching both undergraduate and graduate courses</p> <p>22 that include topics of interfaces, computers, imaging,</p> <p>23 lighting, things like that, and doing research in these</p> <p>24 areas as well.</p> <p>25 And while I've been an engineer for approximately</p>
Page 82	Page 84
<p>1 A. Yes, sir, I have.</p> <p>2 Q. And they are, I understand, slides; is that accurate?</p> <p>3 A. Yes, sir.</p> <p>4 MR. FISCH: Mr. Rennick, could you please put up the</p> <p>5 slides? Thank you.</p> <p>6 Q. (By Mr. Fisch) I see the first one is education. Could</p> <p>7 you tell us a little bit about your education, Dr. Wright?</p> <p>8 A. Yes, sir. I didn't take a direct path. I enlisted in</p> <p>9 the Navy at 17 years old and had -- stationed around the</p> <p>10 world, various assignments, and by the time -- after about</p> <p>11 six years, I was an E-6, and I transferred from active duty</p> <p>12 over to the reserves so that I could use the GI Bill to pay</p> <p>13 for college.</p> <p>14 And then I obtained my Bachelor's Degree in electrical</p> <p>15 engineering from Louisiana Tech University in 1983.</p> <p>16 I then accepted a commission as an officer in the U.S.</p> <p>17 Air Force and had several assignments before I was then</p> <p>18 selected for an Air Force-wide scholarship to obtain my</p> <p>19 Master's Degree in electrical engineering, which I obtained</p> <p>20 from Purdue University in 1988.</p> <p>21 Then I had more assignments in the Air Force, and I was</p> <p>22 then selected for another Air Force-wide scholarship to</p> <p>23 obtain my Ph.D. in electrical engineering, which I obtained</p> <p>24 from the University of Texas at Austin in 1996.</p> <p>25 Q. Very impressive, Doctor. Thank you.</p>	<p>1 33 years, sir, after I had the minimum required work</p> <p>2 experience, I did sit for the national exam for licensing,</p> <p>3 and I've been a licensed professional engineer for 26 years.</p> <p>4 Q. Thank you, Doctor.</p> <p>5 Sir, do you have an opinion in this case?</p> <p>6 A. Yes, sir, I do.</p> <p>7 Q. What is it, sir?</p> <p>8 A. Sir, my opinion is that Samsung infringes Imperium's</p> <p>9 patents.</p> <p>10 Q. Which ones, sir?</p> <p>11 A. The interface patent, the preflash patent and the</p> <p>12 anti-flicker patent.</p> <p>13 Q. And how did you reach that conclusion, Doctor?</p> <p>14 A. Sir, I investigated Samsung's own responses to</p> <p>15 Imperium's questions, and they answered the questions. I</p> <p>16 went through all of Samsung's documentation that they</p> <p>17 supplied. I looked at depositions. I looked at source</p> <p>18 code. I looked at a large body of evidence to come to this</p> <p>19 conclusion.</p> <p>20 Q. How long have you been working on this case, Doctor?</p> <p>21 A. Sir, I've been working on this case for over a year. I</p> <p>22 have put in over 500, 600 hours on this case.</p> <p>23 Q. Did you write a report for this case?</p> <p>24 A. Yes, sir, I produced a report.</p> <p>25 Q. How long?</p>

<p style="text-align: right;">Page 85</p> <p>1 A. Well, sir, the main body of the report, which summarizes</p> <p>2 all of the conclusions, is 154 pages long. All of the</p> <p>3 attachments, product after product after product with lots</p> <p>4 of repetition and lots of blank space, that actually bumps</p> <p>5 it up to over 20,000 -- over 30,000 pages. It's rather</p> <p>6 large and voluminous, but lots of blank space, lots of</p> <p>7 repetition, which if you would take away all that</p> <p>8 repetition, it would only be a few hundred pages.</p> <p>9 Q. In preparing your report, did you use Judge Mazzant's</p> <p>10 definitions of the patents in this case?</p> <p>11 A. Yes, sir. I applied the claims construction from the</p> <p>12 Court when I went through all of these documents.</p> <p>13 Q. Are those the same constructions that are found in the</p> <p>14 juror binders?</p> <p>15 A. Yes, sir, they are identical to the constructions there.</p> <p>16 Q. So you've undertaken an analysis. Where would you like</p> <p>17 to begin sharing it with us, Doctor?</p> <p>18 A. Well, sir, I'd like to talk about the interface patent.</p> <p>19 And so the interface patent solves the problem of</p> <p>20 interfaces.</p> <p>21 Q. What's an interface, Doctor?</p> <p>22 A. Well, in its most basic terms, an interface is a way for</p> <p>23 two devices or two components to talk to each other. And it</p> <p>24 really requires two things. It requires both a connection</p> <p>25 between the two devices, but it also requires some agreement</p>	<p style="text-align: right;">Page 87</p> <p>1 transmit data very quickly, but it takes quite a bit of</p> <p>2 battery power to do that.</p> <p>3 Q. So what does this patent speak to then, Doctor?</p> <p>4 A. Well, sir, the patent solves the problem that was a</p> <p>5 dilemma for designers in that before this patent, a designer</p> <p>6 had to make a choice, single-ended or differential, and then</p> <p>7 live with the consequences.</p> <p>8 And this patent describes a way that you can combine</p> <p>9 the two into a single interface where you can select back</p> <p>10 and forth between the single-ended or the differential when</p> <p>11 you need it. And so you don't have to waste battery power</p> <p>12 when you don't need to, but when you need to transmit data</p> <p>13 very quickly, you can.</p> <p>14 Q. And what about Samsung's products as it relates to the</p> <p>15 patents specifically, Doctor?</p> <p>16 A. Well, sir, Samsung infringes the interface patent.</p> <p>17 Q. With what types of products, sir?</p> <p>18 A. Sir, it infringes with phones, with computers, and with</p> <p>19 tablets.</p> <p>20 Q. Could you walk us through which phones infringe, Doctor?</p> <p>21 A. Yes, sir. So here on the screen I show 16 different</p> <p>22 phones that infringe Imperium's interface patent.</p> <p>23 For computers, there are two models of computers there</p> <p>24 I found that infringe Samsung's -- infringe Imperium's</p> <p>25 patent.</p>
<p style="text-align: right;">Page 86</p> <p>1 in how they're going to communicate.</p> <p>2 So if I were to place a phone call down to Mexico, for</p> <p>3 example, I might have the connection, but I would have to</p> <p>4 agree with the person at the other end that we're going to</p> <p>5 speak English, we're going to speak Spanish, and that</p> <p>6 agreement, in engineer speak, is often called a protocol.</p> <p>7 So you need both a protocol and the connection together.</p> <p>8 And you've seen in the -- in the video testimony</p> <p>9 talking about a CSI-2 and a D-PHY, that's the protocol and</p> <p>10 the connection that makes up an interface.</p> <p>11 Q. What types of interfaces are there, Doctor?</p> <p>12 A. Well, there are many different types, but for the</p> <p>13 purposes of this patent, we're talking about two different</p> <p>14 types of interface called a single-ended interface and a</p> <p>15 differential interface.</p> <p>16 Q. And what are those drawings on the screen, sir?</p> <p>17 A. Sir, those drawings come from the patent itself.</p> <p>18 Q. What else can you share with us about the interfaces?</p> <p>19 A. Well, sir, there are certain advantages and</p> <p>20 disadvantages to the single-ended or the differential as</p> <p>21 they're employed.</p> <p>22 The single-ended interface, while it can only transmit</p> <p>23 data relatively slowly, it doesn't take much battery power</p> <p>24 to do that.</p> <p>25 On the other hand, the differential interface can</p>	<p style="text-align: right;">Page 88</p> <p>1 And for tablets, there are five models of tablets that</p> <p>2 infringe Imperium's interface patent.</p> <p>3 Q. Thank you, Doctor. Where would you like to take us</p> <p>4 next?</p> <p>5 A. Well, sir, these are a lot of models here, a lot of</p> <p>6 individual models. We can't walk through every one, so I've</p> <p>7 chosen as one example product, one representative, and since</p> <p>8 they all infringe in the same way, I can -- I can walk</p> <p>9 through that product and you can apply it to the others. So</p> <p>10 I'd like to discuss the Samsung S5.</p> <p>11 Q. Why the S5, Doctor?</p> <p>12 A. Well, again, it infringes in the same way. The same</p> <p>13 interface is employed in all of these devices, and it</p> <p>14 infringes in basically the same way.</p> <p>15 Q. So you could have selected one -- any of them?</p> <p>16 A. Any of them, sir.</p> <p>17 Q. But you selected the S5?</p> <p>18 A. Yes, sir. They all infringe the same way.</p> <p>19 Q. So would you like to begin the analysis, Doctor?</p> <p>20 A. Yes, sir.</p> <p>21 Q. Would you take us through it, please?</p> <p>22 A. Well, what I'm showing here on the screen, sir, is Claim</p> <p>23 10 from the patent. So if you look at the patents -- and</p> <p>24 here I have written up here at the top "interface," and if</p> <p>25 you turn to the very back and on Column 5 here I've marked</p>

<p style="text-align: right;">Page 97</p> <p>1 sends a signal saying, okay, I'm finished. And then it  2 drops back to -- to single-ended mode. And so these  3 communication or control signals are also sent.  4 Q. So what is your conclusion about this element, then,  5 Doctor?  6 A. Sir, I find that this -- this element is also met, and I  7 can check this box.  8 Q. And, again, to touch on this -- we touched on it just a  9 moment ago lightly, but I'll follow up.  10 Once again, what kind of data has to be transmitted by  11 the interface this time?  12 A. Sir, it can transmit image data, but it doesn't have to  13 just transmit image data. It also can transmit the control  14 signal information as well. It has to be able to talk back  15 and forth.  16 Q. So, Doctor, we've now just walked together through all  17 of Claim 10 of the interface patent. With respect to the  18 Samsung S5, what is your conclusion?  19 A. Sir, I conclude that it infringes the interface patent.  20 Q. Now, Doctor, you mentioned that there were a number of  21 products at the very beginning of your discussion of this  22 patent.  23 A. Yes, sir.  24 Q. How does this one finding of infringement on the S5  25 relate to all the other products you showed?</p>	<p style="text-align: right;">Page 99</p> <p>1 conclusions about the tablets?  2 A. Yes, sir. Again, I would go to the documentation  3 associated with those products, and it includes Samsung's  4 own responses, Samsung's own datasheets and manuals, the  5 MIPI specification, deposition of Samsung engineers.  6 All of this together again brings me to the conclusion  7 that there are models of tablets that infringe the interface  8 patent; in particular, these five models that you see on the  9 screen.  10 Q. So, Doctor, now that we've gone through the analysis  11 that you've just shared with us about the interface patent,  12 do you have an ultimate conclusion regarding the interface  13 patent?  14 A. Yes, sir. After looking at all the evidence and  15 inspecting each individual product, I find that the -- that  16 Samsung is infringing the interface patent.  17 Q. Doctor, I understand you've analyzed the other two  18 patents as well.  19 A. Yes, sir.  20 Q. Where would you like to take us next?  21 A. So I'd like to talk about the preflash patent.  22 Q. What should we know about the preflash patent, Doctor?  23 A. Well, the preflash patent tries to obtain the right  24 amount of lighting when you're taking a picture.  25 If you don't have enough light when you take a picture,</p>
<p style="text-align: right;">Page 98</p> <p>1 A. Well, the method of infringement is the same. I looked  2 at all these documentation sources, mostly from Samsung,  3 some from the third-party vendors like Qualcomm, other --  4 other companies from chips that they use. I looked at the  5 deposition of Donguk Park, which you saw some of just a  6 minute ago. I looked at all this documentation as it -- as  7 it applies to the phones, each of the phone models, and  8 found that each of the phone models that I listed earlier on  9 the screen infringe the interface patent.  10 Q. And which phones, in particular, do you conclude  11 infringe the interface patent?  12 A. These -- these 16 models shown on the screen infringe  13 the interface patent.  14 Q. Now, you looked at other products, too, correct, Doctor?  15 A. Yes, sir. For the computers, I looked at another set of  16 documents that related to those products. Again, lots of  17 Samsung documents, Samsung's own interrogatory responses --  18 that's the answer to questions that -- that Imperium  19 asked -- the MIPI documentation, depositions from Samsung  20 engineers, and all together they led me to the conclusion  21 that -- that there were models of computers that infringe  22 the interface patent, in particular, these two models that I  23 show on the screen here.  24 Q. And what about the tablets, Doctor? You indicated at  25 the start that some tablets infringe. What are your</p>	<p style="text-align: right;">Page 100</p> <p>1 of course, your picture's going to be dark or underexposed.  2 If it puts out too much light when it's taking a picture,  3 your -- your -- your picture will be too bright, washed out,  4 and what we call overexposed.  5 But if it puts out just the right amount of light, then  6 you'll have a well-exposed picture. And --  7 Q. So how is that achieved, Doctor?  8 A. So with the preflash patent, it basically tries to send  9 out a little bit of light ahead of time.  10 I mean, in the old days that wasn't how you did it,  11 though. In the old days you actually had to measure the  12 light yourself; for example, with a -- with a handheld light  13 meter similar to what I'm showing you on the screen. So you  14 had to actually manually measure the light, and once that  15 told you how much light there was, you had to set -- you  16 know, turn little knobs on the camera, set it the way you  17 wanted to. You then had to point the camera, take the  18 picture, press the shutter button, and actually capture the  19 image.  20 Now, that was somewhat tedious. Modern cameras don't  21 do it like that. They have these automatic modes. And in  22 automatic mode, what happens is, as you press the button to  23 take the picture, all sorts of things happen really fast,  24 the blink of an eye.  25 The camera itself will go and measure how much light is</p>



<p style="text-align: right;">Page 101</p> <p>1 out there. The camera itself will set its own settings for  2 you. And then once the settings are correct, it will  3 actually take the picture. And that's how the modern camera  4 does when you take a picture with your cell phone or a  5 camera today.  6 Q. Now, Doctor, yesterday I drew an example of that on a  7 board. Do you have an example to share as well?  8 A. Yes, sir. So if you wanted to take a picture of, let's  9 say, this bowl of fruit, and so you have your camera here,  10 you press the button, and one of the first things that the  11 camera will do is send out this initial little amount of  12 light called a preflash.  13 And so the preflash comes out, the light goes out,  14 strikes the object you're trying to take a picture of,  15 bounces back and is obtained by the sensor where it gets a  16 little -- what's called a preparatory image. It's sort of a  17 pre-image that it's looking at saying, you know, how much  18 light am I going to need for the main flash.  19 And so it then determines from that all the settings  20 that it needs for the main flash and other settings for the  21 camera, and it sets all of those automatically. And then  22 the picture is actually taken.  23 Q. How fast does all that happen, Doctor? This took a few  24 seconds on the screen.  25 A. Sir, it's in less than a blink of an eye. It's the time</p>	<p style="text-align: right;">Page 103</p> <p>1 A. No, sir, I don't. I don't have to open it up. In  2 today's technology, if you -- if you buy, let's say, your  3 cell phone and you were to take the cover off and look  4 inside it, what you'll see is a bunch of chips. That  5 doesn't tell you anything.  6 What tells you things is the documentation by the  7 person that designed and manufactured that device. And so I  8 turned to the documentation that describes how they designed  9 it, how they work, what the functionality is. Just staring  10 at the inside of a device wouldn't help me at all.  11 Q. So, Doctor, how would you like to begin your analysis of  12 this patent?  13 A. Well, sir, I'd like to talk about the fact that when I  14 investigated the preflash methods that Samsung used, I found  15 that there are actually three different algorithms that they  16 use.  17 So in algorithm one I'm showing here on the screen,  18 it's called the Strobo algorithm. It's the oldest.  19 The next one is called the Flash aE algorithm, and it  20 was the next one in the time progression.  21 And then the third one here is just called Flash  22 algorithm, and that's the -- that's the latest one.  23 And so it depends on which model, which product you're  24 looking at which algorithm it uses. But, of course, they do  25 very basically the same thing. They're just follow-ons from</p>
<p style="text-align: right;">Page 102</p> <p>1 that you press the button, and you hear the click, and you  2 see the image. It's all happened that fast.  3 Q. So, Doctor, which Samsung products infringe the preflash  4 patent?  5 A. Well, sir, for the preflash patent, when I looked at all  6 of the -- all of the products and documentation, I found  7 that there were phones and there were cameras that infringed  8 the preflash patent.  9 Q. Which phones in particular did you find, Doctor?  10 A. Well, specifically, I'm showing on the screen here  11 15 models of phones that infringe the preflash patent.  12 Q. And you've looked at all of these phones?  13 A. Yes, sir. I looked at them individually with the  14 documentation.  15 Q. Did you have actual physical specimens of each phone?  16 A. No, sir. I didn't require a physical specimen of each  17 of these models. I had Samsung's own documentation that  18 relates to each of these models.  19 Q. What about the cameras, Doctor? You mentioned that  20 there are cameras infringing as well.  21 A. Yes, sir. When I looked at the different camera models,  22 I found 52 models of cameras that infringed the preflash  23 patent.  24 Q. I'll ask the same question about the cameras. Do you  25 have 52 cameras at home?</p>	<p style="text-align: right;">Page 104</p> <p>1 each other.  2 Q. Where would you like to begin your analysis here,  3 Doctor?  4 A. Well, sir, as I go through and show, I have to show this  5 for each algorithm. So for algorithm one, I've chosen a  6 particular example of a representative product, in this case  7 one of the cameras, a WB2100.  8 Q. And just so I understand, Doctor, there are three  9 algorithms, and to prove infringement across the board,  10 you're going to have to walk us through the claim elements  11 for each of the three algorithms?  12 A. Yes, sir.  13 Q. Understood. So let's start with the first one then. A  14 representative product you identified, just to clarify, is a  15 camera?  16 A. Yes, sir. A WB2100 is a digital camera by Samsung.  17 And so here I'm showing on the screen the exact wording  18 for Claim 1. And, again, from -- from the preflash patent,  19 you turn back to the -- turn to the back of the document.  20 It's not quite at the very back. It's about three pages  21 from the back -- two pages from the back where you can see  22 where Claim 1 is on Column 11.  23 And what I'm showing here on the screen is exactly the  24 same words from the patent that you see on the screen.  25 Q. So, Doctor, could you take us through beginning with</p>

<p style="text-align: right;">Page 105</p> <p>1 Element 1, please?</p> <p>2 A. Yes, sir. So the first element says: A method of</p> <p>3 adjusting image lighting, the method comprising.</p> <p>4 So I have to look into the documentation to see if this</p> <p>5 particular product can adjust image lighting. So if I go to</p> <p>6 the manual for this product -- and you see WB2100 -- but go</p> <p>7 into this document, you can see that it has a flash. So it</p> <p>8 does have a method to adjust image lighting. So I can place</p> <p>9 a checkmark in that box.</p> <p>10 Q. What did you learn about the second element, Doctor?</p> <p>11 A. This element says: Generating a preparatory light for a</p> <p>12 predetermined preparatory duration.</p> <p>13 So this means that preflash -- it wants to fire a</p> <p>14 preflash for an amount of time known ahead of time. Because</p> <p>15 you have to know how much time you have a light on to -- and</p> <p>16 how bright it is to know how much light you're gathering.</p> <p>17 So, again, I turned to the documentation, and in this</p> <p>18 documentation -- this is from the documentation of the</p> <p>19 Strobe algorithm, which is used for this camera. I can look</p> <p>20 at some of the values that are set here, and here it's</p> <p>21 talking about the pre-duration, which is the duration time</p> <p>22 of the preflash or the preparatory light.</p> <p>23 And so it does generate a preparatory light for a</p> <p>24 predetermined preparatory duration.</p> <p>25 Q. What did that teach you, Doctor?</p>	<p style="text-align: right;">Page 107</p> <p>1 preparatory image is represented by preparatory image data.</p> <p>2 Q. And that taught you what then, Doctor?</p> <p>3 A. Again, that this element is satisfied, and I can place a</p> <p>4 checkmark in this box.</p> <p>5 Q. And what did you learn about the next element, the</p> <p>6 fourth element of Claim 1?</p> <p>7 A. Well, sir, this element says: Determining an average</p> <p>8 preparatory image luminance of the preparatory image based</p> <p>9 on the preparatory image data and weighting at least a</p> <p>10 subset of the preparatory image data.</p> <p>11 So luminance is brightness, basically. So it's talking</p> <p>12 about determining the brightness of that preparatory image</p> <p>13 that it took, that little -- that little pre-image that it</p> <p>14 took. And then it's got to weight some parts of that image</p> <p>15 so that it can decide better how to set the main flash.</p> <p>16 And so --</p> <p>17 Q. Doctor, yesterday I talked -- when I was up at the</p> <p>18 easel, I talked about chopping up the image.</p> <p>19 A. Yes.</p> <p>20 Q. Is that what we're talking about here?</p> <p>21 A. Yes, sir. It chops it up into these regions, and these</p> <p>22 regions are what they refer to in the document as these</p> <p>23 patches, and they're going to apply different weights to</p> <p>24 these patches to come up with an idea of how much they're</p> <p>25 going to need for the main flash.</p>
<p style="text-align: right;">Page 106</p> <p>1 A. I can place a check in that box, sir.</p> <p>2 Q. What about the next element? What did you learn about</p> <p>3 the next element of Claim 1, Doctor?</p> <p>4 A. Well, sir, the next element of the claim talks about</p> <p>5 capturing a preparatory image while generating the</p> <p>6 preparatory light, wherein the preparatory image is</p> <p>7 represented by preparatory image data.</p> <p>8 So sort of to decode that a little bit, you use the</p> <p>9 preflash and it's -- this element is saying it took sort of</p> <p>10 a practice image. You can think of it as a practice image</p> <p>11 it's going to use to get the information it needs to set the</p> <p>12 main flash.</p> <p>13 And so I have to determine: Was this preparatory image</p> <p>14 taken, and is it represented by the preparatory image data?</p> <p>15 So, again, I turn again to the documentation, and you</p> <p>16 can see here again documentation from the Strobe algorithm</p> <p>17 where it's showing how it's collecting patch data during</p> <p>18 preflash.</p> <p>19 Well, "patch" is the term used in this document to talk</p> <p>20 about regions of the image that it took. So it's getting</p> <p>21 data from the different regions of this preparatory image</p> <p>22 that it took, and it's going to use it later in order to</p> <p>23 figure out the preflash.</p> <p>24 But this tells me that it did capture a preparatory</p> <p>25 image while generating the preparatory light and that the</p>	<p style="text-align: right;">Page 108</p> <p>1 Q. So what did you learn about this element, Doctor?</p> <p>2 A. Well, sir, if I go into the documentation -- again, this</p> <p>3 is from the Strobe algorithm -- and I can look here, and I</p> <p>4 can see that it's determining the target luminance of</p> <p>5 capture. So this is the captured image, and this target</p> <p>6 luminance is basically what it's going to try to achieve.</p> <p>7 And so when I turn further there, here's a -- here's an</p> <p>8 excerpt again from the Strobe algorithm document where it's</p> <p>9 talking about the different patches. You can see underlined</p> <p>10 it's using a weighted average.</p> <p>11 And so these weighted averages are from these different</p> <p>12 regions of this image that it took and so that it is</p> <p>13 determining an average preparatory image luminance of the</p> <p>14 preparatory image based on the preparatory image data and</p> <p>15 weighting at least a subset of the preparatory image data.</p> <p>16 So, again, I find that that element is satisfied, and I</p> <p>17 can place a checkmark there.</p> <p>18 Q. What about the fifth element, Doctor? What did you</p> <p>19 learn about the fifth element of Claim 1?</p> <p>20 A. Well, sir, what the fifth element says is: Generating a</p> <p>21 supplemental strobe duration based on the average</p> <p>22 preparatory image luminance and luminance weightings.</p> <p>23 So, again, it's the supplemental strobe. That's the</p> <p>24 main strobe. That's the strobe -- the flash that goes off</p> <p>25 for the picture you actually wanted. And how it's coming up</p>

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<p>UNITED STATES DISTRICT COURT EASTERN DISTRICT OF TEXAS SHERMAN DIVISION</p> <p>IMPERIUM IP HOLDINGS (CAYMAN) : DOCKET NO. 4:14CV371</p> <p>VS. : SHERMAN, TEXAS</p> <p>: FEBRUARY 2, 2016</p> <p>SAMSUNG ELECTRONICS CO. : AFTERNOON SESSION</p> <p>TRANSCRIPT OF TRIAL BEFORE THE HONORABLE AMOS L. MAZZANT, UNITED STATES DISTRICT JUDGE, AND A JURY</p> <p>APPEARANCES:</p> <p>FOR THE PLAINTIFF: MR. ALAN MICHAEL FISCH MR. ROY WILLIAM SIGLER MR. JEFFREY SALTMAN MR. JOHN T. BATTAGLIA FISCH SIGLER 5301 WISCONSIN AVENUE NW FOURTH FLOOR WASHINGTON, DC 20015 MR. DAVID MICHAEL SAUNDERS MR. S. DESMOND JUI MR. SRULI YELLIN FISCH SIGLER 96 N. THIRD STREET, SUITE 260 SAN JOSE, CA 95112</p> <p>MS. SILVIA JORDAN FISCH SIGLER 505 EIGHTH AVE, 12TH FLOOR NEW YORK, NY 10018</p> <p>FOR THE DEFENDANT: MR. JESSE J. JENNER MR. CHRISTOPHER JOHN HARNETT MR. STEVEN PEPE MR. KEVIN JOHN POST MR. ALEXANDER ERNEST MIDDLETON ROPES &amp; GRAY 1211 AVENUE OF THE AMERICAS NEW YORK, NY 10036</p>	<p>1 (Jury out.)</p> <p>2 COURT SECURITY OFFICER: All rise.</p> <p>3 THE COURT: Go ahead and bring the jury in.</p> <p>4 COURT SECURITY OFFICER: All rise for the jury.</p> <p>5 (Jury in.)</p> <p>6 THE COURT: Please be seated.</p> <p>7 Mr. Fisch, you may continue.</p> <p>8 MR. FISCH: Thank you, Your Honor.</p> <p>9 DIRECT EXAMINATION CONTINUED</p> <p>10 BY MR. FISCH:</p> <p>11 Q. Good afternoon, Dr. Wright.</p> <p>12 A. Good afternoon, sir.</p> <p>13 Q. Could you pick up where we left off, which was the</p> <p>14 beginning of your analysis of Algorithm 2 for preflash?</p> <p>15 A. Yes, sir. We had just finished Claim 1, going through</p> <p>16 Algorithm 1, so now to go through Claim 1 with Algorithm 2,</p> <p>17 I'm looking here at a document called Flash aE Algorithm by</p> <p>18 Hae Sun Lee. As I look into this document, we're going to</p> <p>19 go through each element of Claim 1.</p> <p>20 And the representative device for this I have chosen to</p> <p>21 be the Galaxy Note2. Once again, the -- all of the products</p> <p>22 that use Algorithm 2 do it in the same way. I could have</p> <p>23 chosen any of them. They all basically infringe the same</p> <p>24 way. So this is just, again, an example document -- an</p> <p>25 example product.</p>
Page 2	Page 4
<p>1 MR. SAMUEL LAWRENCE BRENNER</p> <p>2 MR. SCOTT STEPHEN TAYLOR</p> <p>3 ROPES &amp; GRAY</p> <p>4 PRUDENTIAL TOWER</p> <p>5 800 BOYLSTON STREET</p> <p>6 BOSTON, MA 02199</p> <p>7 MS. REBECCA R. CARRIZOSA</p> <p>8 ROPES &amp; GRAY</p> <p>9 1900 UNIVERSITY AVE 6TH FLOOR</p> <p>10 EAST PALO ALTO, CA 94303</p> <p>11 MR. CLYDE MOODY SIEBMAN</p> <p>12 MR. LARRY PHILLIPS</p> <p>13 SIEBMAN BURG PHILLIPS &amp; SMITH</p> <p>14 300 N. TRAVIS</p> <p>15 SHERMAN, TX 75090</p> <p>16 COURT REPORTER: MS. JUDITH WERLINGER</p> <p>17 DEPUTY OFFICIAL REPORTER</p> <p>18 101 E. PECAN #110</p> <p>19 SHERMAN, TEXAS 75090</p> <p>20</p> <p>21</p> <p>22</p> <p>23</p> <p>24 PROCEEDINGS REPORTED BY MECHANICAL STENOGRAPHY, TRANSCRIPT</p> <p>25 PRODUCED BY COMPUTER-AIDED TRANSCRIPTION.</p>	<p>1 So for the Galaxy Note2, I would like to look at Claim</p> <p>2 1. And, once again, this is exactly the same claim language</p> <p>3 that is from the patent that you have in your folders. And</p> <p>4 the first element of Claim 1 is a method of adjusting image</p> <p>5 lighting, and so I look into the documentation for this</p> <p>6 particular product.</p> <p>7 You can see it has a flash. It has a flash, so it has</p> <p>8 a method of adjusting image lighting. So I can then place a</p> <p>9 checkmark in that box.</p> <p>10 Q. What about the second element, Doctor?</p> <p>11 A. Sir, the second element of generating that preparatory</p> <p>12 light at a preflash, so I can go to the documentation for</p> <p>13 the algorithm, the flash aE algorithm. And you can see</p> <p>14 here, I've blown up a place here and see there at the bottom</p> <p>15 where it's generating the preflash. So it is generating a</p> <p>16 preflash for a preparatory duration.</p> <p>17 And the duration here is a little bit different because</p> <p>18 if you notice the dark black line up on top, that's actually</p> <p>19 the preflash light is staying on. But the -- how long the</p> <p>20 sensor gets light from the flash is determined by that</p> <p>21 little -- the little graph that you see below, the little</p> <p>22 square-topped graph. Each one of those represents an image</p> <p>23 that is captured using the preflash. And the amount of time</p> <p>24 that it took to capture that preflash is predefined. That's</p> <p>25 a predefined duration.</p>

<p style="text-align: right;">Page 5</p> <p>1 If the camera didn't know ahead of time what that</p> <p>2 predefined duration was, it would have no way of making any</p> <p>3 sense of the information it was going to get back from the</p> <p>4 preflash. So even though it leaves it on for more than one</p> <p>5 of those preparatory images, it's still on for a predefined</p> <p>6 duration.</p> <p>7 Q. Doctor, how do you know it's predefined?</p> <p>8 A. Because each of those is the -- is the time that's set</p> <p>9 ahead of time because you have to know, again, the amount of</p> <p>10 power and the amount of time to know how much light you have</p> <p>11 emitted.</p> <p>12 If you don't know those two things, then you can't make</p> <p>13 any sense out of -- out of it. You wouldn't even bother</p> <p>14 using a pre -- preflash if you were --</p> <p>15 Q. So that's the predetermination?</p> <p>16 A. Yes, sir, you have to know that ahead of time.</p> <p>17 Q. What does that teach?</p> <p>18 A. Well, sir, that tells me that Element No. 2 is met, and</p> <p>19 I can place a checkmark in that box.</p> <p>20 Q. What have you learned about Element 3, Doctor?</p> <p>21 A. Well, Element 3 is the -- is the element describing how</p> <p>22 to capture -- to capture the preparatory image while</p> <p>23 generating that preparatory light. And here again, from aE</p> <p>24 flash, the -- the document, you can see where it talks about</p> <p>25 preflash aE data acquisition. And data acquisition is -- is</p>	<p style="text-align: right;">Page 7</p> <p>1 I can place a checkmark in this box.</p> <p>2 Q. The next element, Doctor, what have you learned?</p> <p>3 A. So the next element is generating a supplemental strobe</p> <p>4 duration based on the average preparatory image luminance</p> <p>5 and luminance weightings. So basically it's saying the</p> <p>6 information that I just gathered from that preparatory</p> <p>7 image, that pre-image that I took with a preflash, I'm going</p> <p>8 to use that information to decide how much main flash I</p> <p>9 need. That's what the supplemental strobe is.</p> <p>10 So, again, I -- I turn to the documentation, and you</p> <p>11 can see here where it's calculating how much it needs for</p> <p>12 main flash based on these parameters that it gathered during</p> <p>13 the preflash.</p> <p>14 Q. And that teaches you what then, Doctor?</p> <p>15 A. Well, sir, this element is also met, and I place a</p> <p>16 checkmark in this box.</p> <p>17 Q. The final element, Doctor, what have you learned?</p> <p>18 A. Sir, this -- this is the element that talks about</p> <p>19 generating a look-up table. And if you recall, the look-up</p> <p>20 table was necessary to understand the workings of the -- the</p> <p>21 flash unit in the camera. Every -- every one is a little</p> <p>22 bit different, and if the camera doesn't understand about</p> <p>23 the characteristics of the flash unit, how much duration and</p> <p>24 how much brightness will result in how much light being sent</p> <p>25 out there to the scene, if you don't have that information,</p>
<p style="text-align: right;">Page 6</p> <p>1 acquiring that -- that image. So it's getting that -- that</p> <p>2 pre-image using the preflash.</p> <p>3 Q. And what does that teach, Doctor?</p> <p>4 A. Well, sir, that tells me that this element is also met,</p> <p>5 and I can place a checkmark in this box.</p> <p>6 Q. What did you learn about the next element, Element 4,</p> <p>7 Doctor?</p> <p>8 A. Well, sir, that next element talks about using the</p> <p>9 average preparatory image luminance of the preparatory image</p> <p>10 based upon preparatory image data and waiting at least a</p> <p>11 subset of it to -- of the preparatory image data.</p> <p>12 So, again, I go into the documentation and can see here</p> <p>13 from the documentation of that algorithm where they're --</p> <p>14 where they're using the average brightness. So it's the</p> <p>15 average -- the average luminance.</p> <p>16 Of course, average comes from weighting. And so I</p> <p>17 can -- I can see from this, and I go to the auto-exposure</p> <p>18 guide because that weighting talked about an AE, so I go to</p> <p>19 the -- so I go to the AE document, which is the</p> <p>20 auto-exposure document. And here they're talking about how</p> <p>21 they're using the different weightings to -- to gather the</p> <p>22 information from that image. And this is one of the</p> <p>23 weighting modes.</p> <p>24 Q. And what does all that teach you then, Doctor?</p> <p>25 A. That tells me that this element of the claim is met, and</p>	<p style="text-align: right;">Page 8</p> <p>1 then it can't make sense out of things.</p> <p>2 So when I look into the documentation, I see again that</p> <p>3 it's using this -- this algorithm to do the flash, and I can</p> <p>4 see from -- that this is actually source code that runs on</p> <p>5 that particular device.</p> <p>6 You can see that they reference a flash target table,</p> <p>7 and a flash target table determines the value that then</p> <p>8 points into the table that's -- that's been generated in</p> <p>9 memory that will tell it what duration and par values are</p> <p>10 appropriate for the flash.</p> <p>11 Here, talking about the fact that -- if you read here</p> <p>12 in the line I've blown up here, the one at the top, they are</p> <p>13 concerned with the fact that this LED strobe does not behave</p> <p>14 in a perfect manner. It says right here that it's not</p> <p>15 perfectly proportional to the current, and so the actual</p> <p>16 performance of the LED light is not exactly perfect, so they</p> <p>17 do have to characterize it and let the camera know what that</p> <p>18 characterization is through this look-up table.</p> <p>19 And it's again indicated by the wording down here. You</p> <p>20 see underlined flash exposure chart. Again, this is a chart</p> <p>21 of durations and powers. It has to store the memory so that</p> <p>22 it knows something about the flash that it's going to use.</p> <p>23 Q. What does all that teach you, Doctor?</p> <p>24 A. That tells me that this element of the claim is also</p> <p>25 met, and I can place a checkmark in this box, sir.</p>



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<p>1 A. With respect to this claim, my conclusion is that</p> <p>2 Samsung infringes the preflash patent.</p> <p>3 Q. But your research, your findings indicated that it is</p> <p>4 more than just Claim 1 that was infringed in this patent, is</p> <p>5 that correct, Doctor?</p> <p>6 A. Yes, sir. Yes, sir. I would like to turn next to Claim</p> <p>7 6.</p> <p>8 So Claim 6 discusses the method of Claim 1, further</p> <p>9 comprising accessing the look-up table based on the average</p> <p>10 image luminance.</p> <p>11 And I also have to go through each of the three</p> <p>12 algorithms for us. So for the first algorithm, this is the</p> <p>13 Strobo algorithm. I look into this document, and I can see</p> <p>14 that it's using these weighted averages and it's using that</p> <p>15 to figure out what it needs for the main duration or the</p> <p>16 main flash and so that it -- this confirms that it really is</p> <p>17 using that table that it has stored and that is -- that is</p> <p>18 what this claim says.</p> <p>19 So I can place a checkmark in this box for Algorithm 1.</p> <p>20 Q. Because there's just one element of Claim 6, your</p> <p>21 conclusion with respect to Claim 6 now is what, Doctor?</p> <p>22 A. Yes, sir. Now I have to look at Claim 6 again for</p> <p>23 Algorithm 2. So Algorithm 2, again, is the Flash aE</p> <p>24 algorithm, and here they're talking about using that average</p> <p>25 brightness -- so there's the average image luminance --</p>	<p>1 A. Sir, Claim 6 is infringed by Samsung on the preflash</p> <p>2 patent.</p> <p>3 Q. Now, your research indicated that there was an</p> <p>4 additional claim. Which claim was it, Doctor?</p> <p>5 A. Yes, sir. And turn to Claim 7. Now, Claim 7 will be a</p> <p>6 little faster, because Claim 7, if you look at it, you'll</p> <p>7 find that the wording is almost the same as Claim 1 except</p> <p>8 for the additional phrase "machine-readable instructions."</p> <p>9 You'll see that sort of in front of each one.</p> <p>10 So basically what that's saying is machine-readable</p> <p>11 instructions in this context is just a computer program,</p> <p>12 okay? So it's saying that there's some computer program</p> <p>13 that runs -- that does these things.</p> <p>14 And since I already showed that each one of these</p> <p>15 elements from Claim 1 is performed, and I know how the</p> <p>16 camera has to operate, that it's running on a little</p> <p>17 computer inside the camera, then each of these elements then</p> <p>18 have to be met, and I can place checkmarks in these boxes.</p> <p>19 There's no other way for the camera to work.</p> <p>20 Q. And, Doctor, you've now walked us through Claim 1, Claim</p> <p>21 6, and Claim 7, the three claims you found to be infringing.</p> <p>22 What is your ultimate conclusion regarding the preflash</p> <p>23 patent?</p> <p>24 A. Sir, I conclude that Samsung infringes the preflash</p> <p>25 patent.</p>
Page 14	Page 16
<p>1 accessing the lookup table -- that comes from this -- this</p> <p>2 calculation that they're doing, which is going to point them</p> <p>3 into where the proper values are in the lookup table.</p> <p>4 And you can even see just a little bit outside of the</p> <p>5 red circle, just below it to the right, you can see they're</p> <p>6 talking about basing it on the flash exposure chart. So</p> <p>7 there's that chart again. That's that table that they have</p> <p>8 to have stored.</p> <p>9 And so based upon this, I know that this element is</p> <p>10 met, and I can place a checkmark in that box.</p> <p>11 Q. That leaves Algorithm 3 with respect to Claim 6, Doctor.</p> <p>12 What have you found?</p> <p>13 A. Yes, sir. Once again, Algorithm 3 is the flash</p> <p>14 algorithm, the newest of the three. And when I look into</p> <p>15 this, I can look further in the document, and you can see</p> <p>16 where it's calculating this MainGV or the brightness that it</p> <p>17 needs for the main flash.</p> <p>18 And it's obtained from using this TargetG in the</p> <p>19 preflash calculated, and it's using all of this data to then</p> <p>20 find out what value is correct in that look-up table. So</p> <p>21 it's -- it's accessing the look-up table using this average</p> <p>22 image luminance.</p> <p>23 So that allows me to place a checkmark in this box.</p> <p>24 Q. So what is your ultimate conclusion regarding Claim 6,</p> <p>25 Doctor?</p>	<p>1 Q. And that was on the representative products you began</p> <p>2 with. I know you've looked at other phones and certainly</p> <p>3 other cameras. So could you walk us through your thinking</p> <p>4 on that as well, please?</p> <p>5 A. Well, for all phones, this is a list of the categories</p> <p>6 of documents that I looked at to come to these conclusions.</p> <p>7 Certainly Samsung's own answers to Imperium's questions, all</p> <p>8 the different guides and manuals, all of the exposure guide</p> <p>9 libraries, modules, source code for the devices, even the</p> <p>10 deposition of Hae Sun Lee on how this works, and that's what</p> <p>11 led me to the conclusion on each of those models of the</p> <p>12 phones.</p> <p>13 And so I concluded that these 15 models of phones are</p> <p>14 infringing the preflash patent.</p> <p>15 Q. And what about the cameras, Doctor?</p> <p>16 A. For the cameras, again, lots of documentation, most of</p> <p>17 it by Samsung, their own responses to the interrogatory, all</p> <p>18 the user guides and manuals, different source code, other</p> <p>19 documents, the deposition of Jaehun Lim.</p> <p>20 All this together drew me to the conclusion that those</p> <p>21 52 models of cameras actually are infringing the preflash</p> <p>22 patent, and these are the 52 models.</p> <p>23 Q. Doctor, thank you for walking us through the preflash</p> <p>24 patent. That leaves just one patent left.</p> <p>25 A. Yes, sir.</p>

**EXHIBITS 31-32**  
**Redacted in Their**  
**Entirety**